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DECEMBER, 1920

Index to Advertisers - - - Page 39
Table of Contents - - - - Page 41
Power Plants Section - - Page 129

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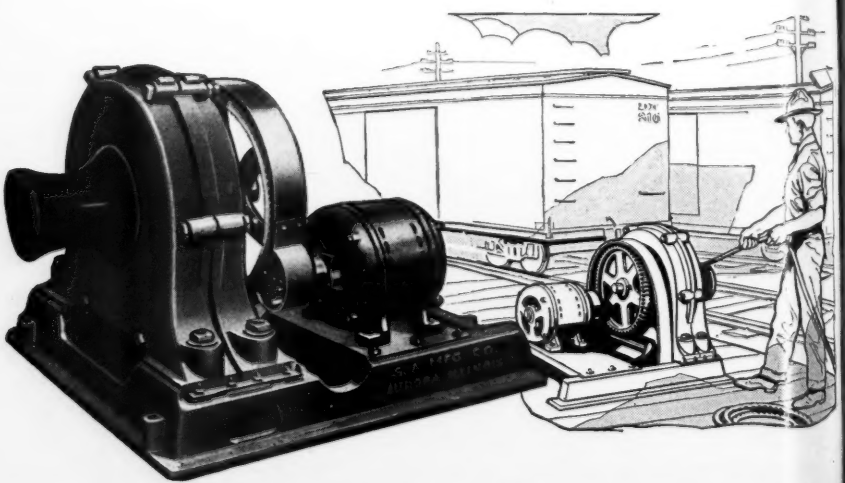

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VOL. 5 CHICAGO, ILL., DECEMBER, 1920 NO. 3

CONTENTS OF THIS ISSUE

Where the Money Goes 43
Convention Dates 46
Are We Losing An Opportunity? 47
For City Trade Only 48
Blasting by Tunnels 50
Break Rock by Contract 52
Rapid Opening of Pit 53
Winter Work in Pits and Quarries 54
Handling Stone Twice 56
Convention in December 58
Texas Producers Unite 58
Electricity in Pits and Quarries 59
Moving Freight Cars by Hand 62
Foundations for Machinery 62
Better Times in Chicago 63
Demurrage in Nebraska 64
Chutes for Pits and Quarries 65
Good Prospects for Road Building 66
Plant Story in Photos 68
How to Cut Belts 76
The Efficiency of Blasting 79
Institutional Management for Business 80
Reply to Criticisms of Proposed Law 84
Unusual Developments 88
Stripping by Blasting 89
One-Third Production in Indiana 90
Slider Has New Office Building 92
Gypsum Field Reviewed 93
Better Rate on Bonds 94
Waste Rock Is Valuable 95
Eastern Trade Review 96
Power Plant Section 131

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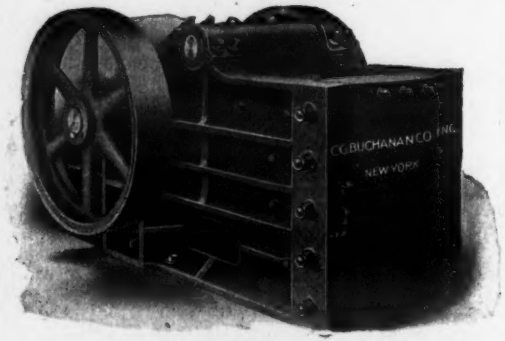

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Pit and Quarry

Vol. 5 Chicago, Ill., December, 1920 No. 3

Where the Money Goes

WITH so many investigations being conducted regarding the price of building materials, it will be worth while to get the fact firmly established that practically 100 per cent of the increase in retail prices of pit and quarry products over the prices of pre-war times, is due to the numerous increases in freight rates and the uncertain and insufficient car supply.

Possibly a small percentage could be attributed to increased wages for labor, and the greater cost of machinery and equipment; though, if plants were allowed to operate unhampered, with the demand for their products as the only limiting factor, the increased market would, in a measure at least, absorb the increases on labor and other plant items.

This may be considered by some as an extreme statement of the case, but it is nevertheless concurred in by some of the most levelheaded men in the industry.

It is understood that at the present time the United States Office of Public Roads is making a cost study of its own with relation to the production of road building materials. We are not advised as to just the nature of this investigation, but we hope it is different from the ordinary type of so-called "cost study," which has served to bring this class of investigation into some measure of disrepute.

As these studies are sometimes made, we can in imagination see an investigator of the Office of Public Roads rushing out to a stone or gravel plant, watching the progress of a few tons of material from the quarry to the cars, with stop-watch in hand, asking a few questions about wages, and then hurriedly taking his departure for the next town. On the basis of such an investigation as this, he will probably be able to report that the producer can sell stone at a dollar a ton, and make a handsome profit.

It will be very much to the detriment of the pit and quarry industries, and will be in direct opposition to the public interests represented by the Office of Public Roads, if any such compilation of figures should be made. We do not know that an investigation is being made this way; but whatever the figures may show, if they are ever made public, the producers will in any event be able to interpret them for what they are worth, and should be able to explain them to the public.

Any investigation, to be of real value, must cover a sufficient period of time to be representative of actual conditions in the industry. It must cover the days when the plant is closed down entirely or running only part time, because of lack of cars, while at least the greater part of the expense continues

just the same. It must take into consideration that producers are getting out only 25 to 40 per cent of their capacity, notwithstanding the fact that the demand has been such as to keep them running full time at maximum production if transportation facilities had been adequately provided.

Pit and quarry operators were not among the favored producers during the war period, and consequently have no great surplus profits from which to finance a period like the present. Whether idle time should be paid for in increased price of the product actually sold, may be a debatable question for economic theorists; but as a practical problem for our operators, it is the only basis on which they can continue in business.

As the time for the convening of Congress comes on, people begin to wonder whether there is anything which can be done in the way of national legislation to relieve the difficulties of transportation. PIT AND QUARRY recently asked one of the best posted men in the industry what he thought might be done in this direction; but he said that the problem was entirely too deep for him.

It is generally agreed that something should be done to curb the arbitrary power of the Car Service Division.

In this connection, it is worth while quoting the statement of Mr. Ben Stone before the Calder Committee, when it held its hearing in Chicago:

The officials of the Car Service Division bureau have undertaken to interpret the Interstate Commerce Commission's orders for all of the roads individually and collectively. They have made arbitrary rulings and demands for continuous movement of empty cars from one road to another, thus heavily increasing operating costs, and have denied the right of an individual road to apply the Commission's orders in a manner that would best conform to conditions on that road.

In my opinion this plan as it has been operated so far has violated fundamental principles that are vital to the public welfare, and while I am not prepared to say that the Car Service Division is not needed as a point of contrast between the Commission and the carriers, I believe the absolute control of car distribution which has been exercised by this bureau up to now must be discontinued before we can approach a more satisfactory condition as regards car service.

A most forceful example of this has just come to my attention today. On November 6 the Interstate Commerce Commission amended Service Order No. 20 so as to remove from the coal car classification all open cars under 42 in. in height, inside measurement, and which it was estimated would increase the number of cars available for other than coal loading by 25,000. But, regardless of the fact that the Commission's order as it relates to loading of coal cars in direction of the mines has not been changed, the Car Service Division has served mandatory instructions on roads in this region that no cars with sides over 42 in. in height may be loaded in any direction except with coal.

I trust I may be pardoned if I say in closing that I think it is to be regreetted that the Congress did not find some way of dealing with this important question and I believe many others share this sentiment. Nevertheless there are many more, I know, who will join me in expressing the hope that the labors of this committee will crystallize during the eearly days of the coming session of the new Congress into positive and constructive action.

The industry will concur in Mr. Stone's appeal to the committee, that it give careful consideration to the advisability of having paragraphs 12 and 15 of section 402 of the Transportation Act of 1920 either stricken out or so amended that the rules, regulations and practices legally published to govern

car service may not be set aside in times of peace, until full hearing has been granted to all interested parties.

The committee has, however, given little indication of any desire to recommend any decisive action, and those who have attended the hearings of the committee, or have followed its proceedings, have very little expectation that there will be any alleviation of burdensome conditions as a result.

In fact, it is probably too much to hope that the Congress now convening will do very much constructive work. With the inaugural of a new and politically opposite administration but three months away, it is not likely that any measures outside the ordinary routine will be passed. But some remedy must be applied before very long.

In the normal course of things a railroad as a common carrier is responsible to shippers for furnishing the necessary facilities for making shipments. Before the era of preferential service and special rulings a railroad could be held accountable for failure to furnish such service, and damages obtained against it. With the interposition of the Car Service Division, the railroads may with a show of justice say that this matter has been taken out of their hands and that they can no longer be held responsible.

This is something which has not yet come to a legal test, and it would be well worth while to have the wings of the Car Service Division clipped before any such issue might be joined. The responsibility for giving service should be kept squarely up to the railroads—where it belongs.

So these two—freight rates and car supply—are the outstanding factors of the situation. Already we have become familiar with the face of the rate maker, and are perhaps prepared to endure his presence for a while at least. But the incubus of discriminatory car service is a vicious monster of such frightful mien that our hatred of it should know no compromise.

Another forcible representation in the interest of the mineral aggregate industry was the statement of John Prince to the Calder committee which met in Kansas City on November 17th.

Mr. Prince told the committee that while the average increase in price of mineral aggregates in his district in 1920 over 1914 was 100 per cent, ten other commodities, as given by Babson increased 220 per cent. He further gave an illustration of the increase in the cost of sand in Kansas City, showing the average increase in freight and war tax to be 158 per cent and that only 65 per cent of the increase was under the control of the producers. Another illustration given by Mr. Prince was that the present freight rate from Kansas City to a given point was higher than the rate on coal, notwithstanding the fact that sand sells for 71 cents net per ton at the plant while coal sells for $6.50 per ton at the mines.

In his statement, Mr. Prince dwelt largely upon the car situation and supplied the committee with recommendations for new legislation which would take from the Interstate Commerce Commission the power to declare an emergency without a full hearing where all the facts can be presented. He urged that the present Transportation Act be revised so as to eliminate all discrimination as between shippers and commodities and a return to the rights given shippers in the original Transportation Act of 1887.

Some details of Mr. Prince's presentation were as follows:

The freight rates on mineral aggregates in this territory have increased to such an extent that they have greatly increased the cost of the commodity to the consumer. A careful check of 5,266 cars shipped by five producers in different parts of this territory shows an increase in freight since June 1, 1918 of 82 per cent or including the war tax, an increase of 87½ per cent. Of these cars, 1,486 were moved on switch movement or equivalent. The revenue paid the railroad per ton mile on the short haul movement has increased from 2.5 cents per ton mile to 4.5 cents per ton mile while the revenue derived from the railroads from the balance of the cars showing an average haul of 70 miles has increased from .95 cents per ton mile to 1.73 cents per ton mile. Considering the nature of the commodity we feel that these rates are excessive and act as an undue burden on the construction industry.

The largest single factor in halting the construction work laid out for this district as it has been affected by the supply of mineral aggregate, has been the well-known lack of transportation. These materials must of necessity be loaded in open top cars and the shortage of these materials and the consequent abandonment of a large part of the construction of program in this district has been due to the inability of the industry to secure the necessary open top cars.

The industry feels that it has suffered unnecessarily and unjustly as a result of that part of the Transportation Act of 1920 which placed in the hands of the Interstate Commission, not only the distribution of open top cars in the case of emergency but the power to declare without notice, hearing or the making or the filing of a report, when such an emergency existed.

The many orders of the Commission which are well known to the Committee resulted in the placing of the principal supply of open top cars of the country in the hands of the coal mines for the loading of coal without any control exercised on the part of the Commission as to the purpose for which this coal was loaded.

While the shortage of open top cars in this district throughout the year has been acute, it has not been uniformly felt by all producers. Producers located at large centers where many coal cars are made empty have in some cases received a fair supply of open top cars for loading, while at many interior points the producers have been unable to secure even a portion of the supply necessary to provide reasonable uniform or sufficient production to result in economical operation.

This industry is opposed to the principle of placing in the hands of any Commission, the power to put out of business by regulation, any essential industries in this country. It is not fair to such industries that priorities giving the use of the transportation facilities of the country be given to the production of any commodity unless the priorities are extended to cover the use of that commodity. We feel that the height of injustice has been obtained when any non-essential industry in this country could secure, if it could pay the price, an adequate supply of coal at the expense of an industry so essential to the country as the construction industry.

Convention Dates

Nebraska Mineral Aggregate Association—Omaha, December 15, Hotel Fontanelle.

Missouri Valley Association of Sand and Gravel Producers—Kansas City, December 16 and 17.

Indiana Sand and Gravel Association—Indianapolis, December 1 and 2.

Indiana Crushed Stone Association—Indianapolis, December 16, Claypool Hotel.

Wisconsin Mineral Aggregate Association—Milwaukee, December 16.

National Crushed Stone Association—Toronto, Canada, February 8, 9, 10.

National Association Sand and Gravel Producers—(Tentative place and date) Louisville, Ky., January 12, 13 and 14.

Are We Losing an Opportunity?

IT is with some regret that PIT AND QUARRY, as this issue goes to press, notes the waning possibility of some kind of concerted action among the big national associations.

One all-embracing organization might be a good thing, or it might not; but at least we should have been glad to see these people meet at the same time, in the same city, with perhaps one joint session for the discussion of common problems and the choice of one or two joint committees for the common good.

At its worst it could not have been a very harmful experiment; and we are inclined to the belief that the idea has in it possibilities for a considerable advancement of all the industries represented.

Balance Between Size of Blast and Size of Steam Shovel

IN some quarries where "blanket" blasting is employed on a low face, blasting may precede steam shovel loading by a long period of time. Under such conditions the two operations are independent of each other insofar as size of blast and width of steam-shovel cut are concerned. In other quarries steam-shovel loading follows blasting closely. In blasting on a high face the rock brought down by one blast is all removed before another mass is shot down, but in "blanket" blasting on a low face, a definite width of shattered rock may be left for a buffer. In either case the position of the steam-shovel tracks for the final cut is guided by the position of the face. One of the necessary conditions for efficient loading is that each cut shall be the maximum width the shovel is capable of handling. Therefore it is important that the mass to be removed is of such width that it may be taken in full cuts. Usually the mass is removed in two or three cuts. The actual number of cuts varies because it depends on the size of the shovel and the magnitude of the mass that may be shot down efficiently at one time, but it is important that the mass shall not require a narrow cut to complete its removal. For example, if the mass to be removed is 2½ cuts wide, the expense of moving the track and the number of moves for the shovel are the same for the half cut as for a full cut, consequently the cost of loading the half cut is excessive. Therefore the blasting foreman should so judge the magnitude of the charges that the mass of shattered rock resulting from the blast shall when lying at the maximum angle of repose be of such a width that it may be removed at one, two, or more full cuts. On the other hand if it is found that a blast of a certain size gives greater efficiency than those of larger or smaller size, then the size of the steam shovel should be such that it can load the entire mass in full cuts. The proper adjustment may therefore be made by varying either the size of the blast or the size of the steam shovel, the method of adjustment being governed by quarry conditions.

Revenue produced by the present freight rates is insufficient to sustain the railroads, A. H. Oliver, division freight agent of the Southern railway, testified before the Illinois public utilities commission, which is investigating railroad earnings in Illinois since the return of the properties to their owners. The Southern railway, Mr. Oliver said, had operated at a loss for the first six months of the year. He added that the best that could be hoped for for the succeeding months up to Nov. 1 was an "even break."

For City Trade Only

New Indianapolis Plant Depends on Its Own Transportation

IS IT possible for a gravel company in any city of more than 100,000 population or such a matter to "get by" with city trade alone? R. C. Kaster, secretary-treasurer of the Eaton-Kaster Gravel Company, of Indianapolis, believes one of the crying needs of most cities of the class above mentioned is a plant that will look promptly after city work. The Eaton-Kaster Company not so long ago finished a plant designed primarily for city service. The plant has been in operation long enough to determine its value to the community.

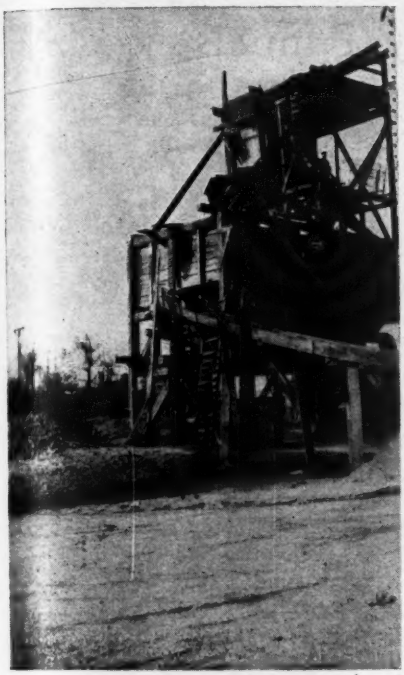
The new industry was favored in one particular, in that, knowing the city trade was going to be the bulk of the business and realizing they could not depend upon railroad transportation for deliveries of this sort, it was not necessary that they locate their plant with the proximity of a railroad considered. Consequently, the officers discarded any thought of a railroad switch and set about finding the best available deposit. They found what they wanted and leased 22 acres several blocks from a railroad in the southwest section of Indianapolis. The plant is on Eagle Creek and the gravel is in a former bed of the creek and the present bed. Since beginning operations the company has dredged down into the creek more than 70 feet and has not reached the bottom of the gravel deposit.

Even though the transportation question was shoved into the background, the site the company selected is singularly adapted for city deliveries. The plant is just about a half block to the south of one of the main arteries leading into the city proper, a thoroughfare which will be paved next year. Even at the present time the plant is only about four blocks from the end of the Morris street pavement.

A careful survey of methods of transportation convinced the company officers that the motor truck is the thing for the short haul. Accordingly trucks were purchased and the company since that time, according to Mr. Kaster, has learned that this course was right.

R. C. Kaster,
Secretary-Treasurer.

Loaded truck starting out from the plant.



Plant of Eaton-Kaster Gravel Company

"We have motor troubles, of course," said Mr. Kaster, "but we know that the expense we have incurred for repairs, storage and other incidentals have been less than we could have hoped for had we been depending upon the team and the 1-yard capacity wagon.

"Our trucks have a 5-ton capacity. The time of delivery is cut in two and by far the biggest thing of all is the fact that we are giving the customer service. You know, the American public wants its purchases delivered promptly and expediously, and that is where the truck shines. It does not take us all day to fill an order, unless, of course, it is a large one, and we are able to gauge with a fair degree of accuracy just about what time it will be when the delivery is to be made. We make a special effort to have the delivery on the job at the time specified or before."

When the company first began to produce, railway transportation was mighty poor and while other companies were praying for cars and cussing the railroads this particular company was making deliveries every day. No plans have been made as yet for enlarging the scope of the deliveries beyond Marion county and it is doubtful if any thought will be given the matter so long as the field inside the county is so productive. At one period before the weather halted building operations, the company was working ten trucks a day, and next spring when the season starts full again the company is expecting to keep twice that many trucks busy.

Although this story concerns a gravel plant, it really centers about a garage. For a time the company hired its trucks cared for in a public garage, entailing storage and repair bills. Mr. Eaton and Mr. Kaster began figuring how this cost might be cut and finally a five year lease was taken on a garage building on North Capitol avenue right across from the Stutz Motor Car Corporation and in the heart of "automobile row" in Indianapolis. Some work was done to make the garage fit its new needs, expert mechanics were employed and a sign put out in front telling the public that this was Eaton-Kaster's garage, where all repair work was welcome. The garage building is sufficiently high to permit the trucks being repaired there, a thing that is practically impossible in the ordinary garage because of the low clearance, and there is plenty of room to take care of a vast amount of repair work. At the present time it is doubtful if the repair work is paying for the overhead on the garage, but it cuts down the dead loss on the repair work to the trucks and next spring Mr. Kaster feels that the garage not only will pay for itself and for the cost of upkeep of the trucks, but will make some money. E. B.

Blasting by Tunnels

DURING the winter season, especially in those quarries that shut down for several months, it is an opportune time to make preparations for the early blasting in the spring. In quarries where the ledge is deep and tunnel blasting is used, the winter time is the best season of the year to drive the blasting tunnels. In quarries where this method of blasting has not been done and the conditions justify it, this is the time to decide upon trying out the method and seeing if it does not prove cheaper than the drilling and blasting done in the past.

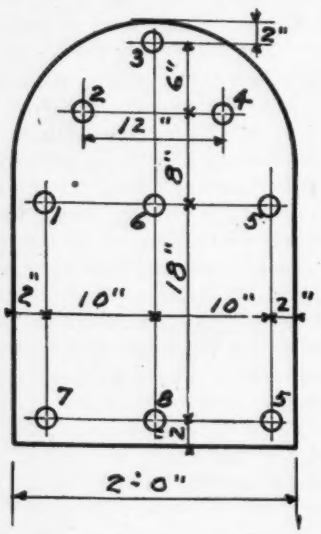


Fig. 1—Face of tunnel showing location of drill holes

For the most economical results, the ledge should be 60 feet or more in depth, although even greater depths can be handled in this manner, the writer having seen ledges 200 feet in depth, shot by means of small tunnels.

If more than one tunnel is to be driven, then all of them should be started in the fall and early winter, so as to reach a distance of 15 feet or more from the face, as then the men are protected from the inclement weather, and to some extent from the cold temperature, so that during the worse weather of the winter this tunnel driving can continue. After starting all the drifts, if only one crew is used, then two of the tunnels can be driven at one time.

While the drilling and blasting are going on in one drift, the mucking out of the blasted rock can go forward in the other one. One man and a helper will do the drilling and the blasting, and two or at the most three men will pick up the muck and carry it out of the tunnel, depending upon the distance driven into the ledge.

After a cross or a T is started in a tunnel, the drilling and mucking can

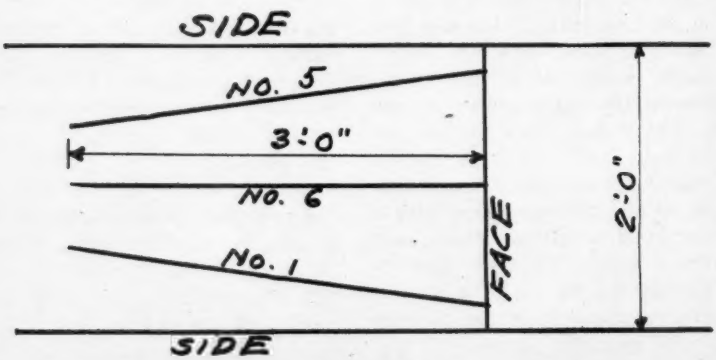


Fig. 2—Top view showing holes Nos. 1, 6 and 5

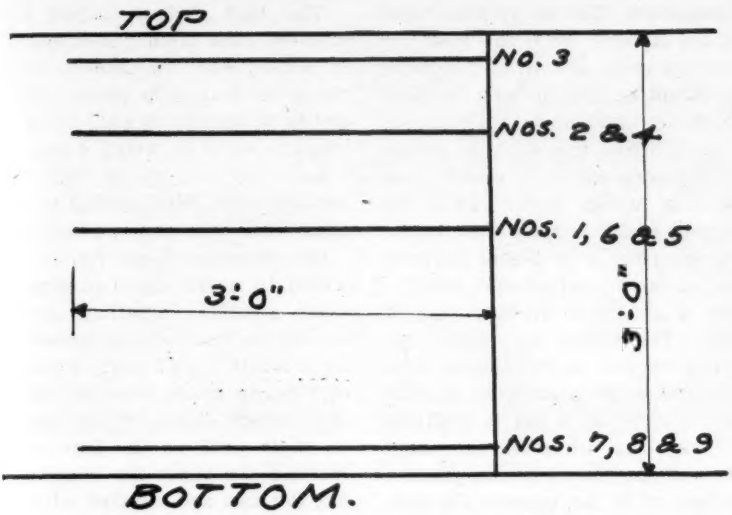


Fig. 3—Side view of tunnel showing drill holes

go on in the same drift, but at different places, thus saving the carrying of drills from one tunnel to another.

These tunnels are made about 2 feet wide and not over 3 feet high, although they frequently break to larger dimensions, just large enough for men to work in when crouching down. The bottom should always be on a grade of from 1 to 2 feet fall to 100 feet. This is to keep them dry, should water be found in the ledge, and also to make it easier to take the blasted muck from the tunnel. The drainage at times is very important.

Experimental work should be done in the drilling and blasting, so as to get it down to the most economical basis. After several rounds of experimental holes and charges, a certain arrangement should be decided upon and the same repeated over and over again.

In the accompanying figures is shown the arrangement of holes used in one tunnel in trap rock. The cross-section in Fig. 1 shows the spacing of the holes. Nos. 1, 2, 4 and 5 are drilled on an angle as shown in Fig. 2, so as to bring these holes within 6 inches of one another at a depth of 3 feet. These six holes, known as "cut holes," are fired together, so that the entire top of the tunnel is thrown out. Then the three bottom holes are fired and as the material on top of them has been loosened and thrown out, these holes can carry a heavier load and throw it against the roof.

The sketch in Fig. 3 shows a side view or section of the holes. The holes are shot with fuse, as it is cheaper and more effective than elec-

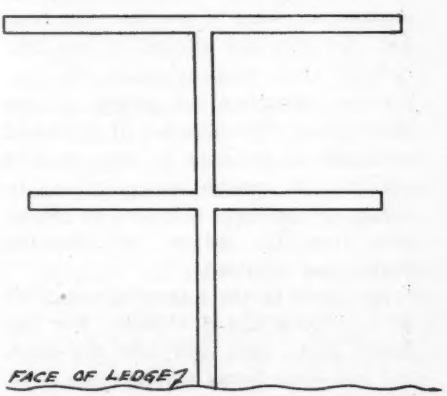


Fig. 4—Showing the layout of a tunnel

trical exploders. The entire nine holes are loaded at one time, the fuse for the first six holes are all of the same length except an inch or two to make them fire simultaneously. The fuses for Nos. 7, 8 and 9 are made longer than the others, so as to go off from a half to a minute later. Thus the greater part of the muck will be blown out so that from 2 to 3 feet advance is made in the tunnel at each blast.

In Fig. 4 is shown the floor plan of a tunnel. The proper method of laying out a tunnel is by means of a small compass or transit, as in this manner only, or by a set of sighting sticks, can the direction be kept straight and one tunnel driven parallel to another, or if the tunnels are radial, kept properly spaced.

Break Rock by Contract

Method Used in a Well-Known Quarry in North Carolina

THE men breaking the rock and loading the skips at the Neverson Granite Quarry, near Sims, N. C., are known as "contractors" for they are paid a flat rate for each skip they load. These men breaking the rock do it mostly by sledges weighing 20 pounds. For each half day they are allowed to use four "adobe" shots with dynamite, the contractors selecting the places to use their shots. The number of stocks of dynamite to be used in each shot is not limited, enough being allowed to break up the large boulders or loosen rock from the ledges, by shooting seams and crevices.

All shots in the quarry are put off at 12 o'clock and 5 o'clock. For the adobe shots, caps and fuse are used, red hot irons being employed to light the fuses. None of the boulders are drilled before being blasted.

The best sledges among the contractors load from six to eight skips in a day; even the poorest ones make three or four skip loads. The skips are large enough to hold enough stone when crushed to weigh 4 tons, and at times they are up to this standard, but the men have gradually skimped them until they average only 3½ tons.

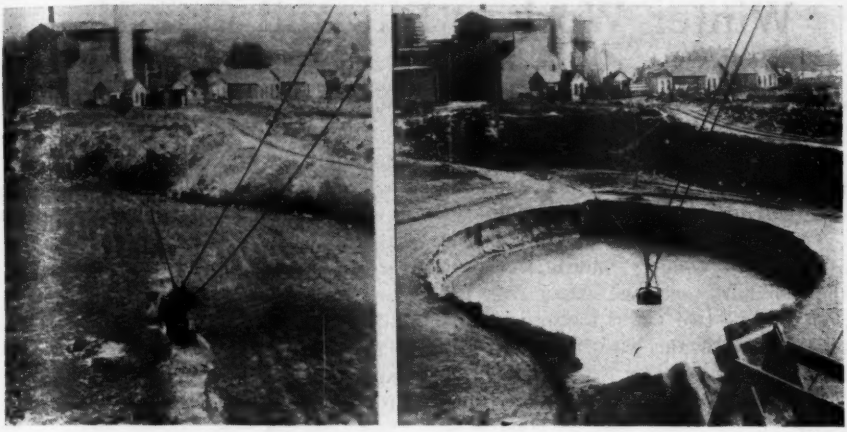
One would suppose the contractors would be keyed up to loading all the skips possible, but they seem satisfied when they obtain enough to net them a fair week's pay. Furthermore, they waste much time waiting to get their adobe shots, rather than carry on their work to the best advantage between the times for blasting. Then, too, the men are satisfied with the pay they make in five days, so that the contractors do not work on Saturday.

The company runs four steel derricks with bull wheels, with 110 ft. masts and 100 ft. booms, manufactured by the American Hoist & Derrick Co. These derricks are operated by 9x10 double-cylinder, double-drum Lidgerwood hoisting engines with a swinging attachment. These engines have a place for a boiler, but boilers are not used, as steam is furnished from the marine boilers.

One derrick is set up near the center of the pit about 300 feet from the crusher plant. It serves skips to the central part of the quarry and places them under the two other derricks. These two derricks serve the rest of the quarry and take the skips from the quarry derrick and dump the stone into the crusher.

The serving of crushers with derricks is not unusual, but seldom are such excellent derricks used or as large, so that stone located 400 feet from the crusher can be fed to it with two derricks.

The derrick men, powder men, and those working around the crusher plant are the only ones paid day's wages.



Photos of Indiana pit taken two months apart.

Rapid Opening of Pit

Indiana Company Illustrates Progress Made in Two Months

THE above photographs of a 600 foot span 1½ cubic yard Sauerman dragline cableway excavator recently installed by the Indiana Gravel Company of Indianapolis, illustrate how rapidly a new pit can be opened up.

The view at the left, taken on August 14, shows the dragline cableway just after it had begun operations. At the right, is a photograph of the same scene two months later.

The pit, which is the result of operating the cableway 40 actual working days, is about 100 feet across and 50 feet deep, extending 40 feet below the water-level.

J. A. Shearer, well-known in association circles, is president of this company, and this is his second outfit of the kind, the other having been in use eight years.

The Antioch Limestone Pulverizing Company, Antioch, O., was incorporated, capital stock $25,000. Directorate is composed of H. M. Hoff, J. R. Ullom, W. G. Stewart, J. E. Dornbusch and G. T. Polen.

Pipe Line Velocity

PIPELINE velocities of 10 to 12 feet are inadequate when pumping gravel unmixed with clay or mud. Instead, velocities of 15 feet and higher are not only economical but are almost essential to success. These conclusions, stated by Pierce J. McAuliffe in Engineering News Record, are based on specific observations made recently on a large dredge operating in gravel, and are confirmed by general experience with many pumps handling all varieties of materials. On several occasions, he says, these conclusions have been put to test, with gratifying results, although, in some instances where horse power and not peripheral speed of the runner was the limiting factor, it has called for the seemingly paradoxical action of decreasing the diameter of the entire pipe line to obtain greater output.

Edward T. Hamilton, manager of Joseph Doherty & Brother's sand and gravel business at Bridgeport, Conn., has again won aldermanic honors, having been re-elected to represent the Seventh District of Bridgeport. Mr. Hamilton has already served in the council for four years, during one year of which he was its president.

Winter Work in Pits and Quarries

By DANIEL J. HAUER

TO carry on continuous quarry operations, especially in the broken and crushed stone business, is seldom a money-making business during the winter, as compared to summer operation. This is true all over the country, but is worse in the northern sections than in the South. The two worst factors against operation are the weather and the lack of business.

The weather conditions sometimes cause an increased cost of from 5 to 30 per cent, for neither men nor machines can produce as much work as under the warmer weather conditions. The variation in cost is due to whether hand labor or machine methods are used, the hand methods increasing in cost much faster than those of machines, while the increased production costs of machines will vary according to the kind of power used. Thus, with steam the loss of power is large in the cold, inclement weather of the northern winters, as pipes freeze and forces of men must right things while machines stand idle. With electrical power little trouble is experienced in this connection.

Besides the factor of weather in considering winter operation, the available capital in hand and the sales to be made, both during the winter and the coming open season, must be taken into consideration. Thus, if there are absolutely no sales to be made during the winter and the quarry operator has only enough money in hand to tide him over the winter and start up in the spring, it would be poor business to do work during the winter, even if he could borrow money for use during that season. The fact of going into debt and having to pay interest upon the borrowed money would likely be a serious handicap during the rest of the year, unless this money was used to make such improvements in the quarry and upon the plant as would materially reduce the operating costs in the future.

On the other hand, if there are some sales that can be made during the winter of some or all of the products, and the sales during the regular season will more than tax the capacity of the plant, and money either is in hand or can be obtained under favorable conditions, then it is obvious that to operate during the winter may be a paying proposition, even if costs do increase. This is the case in many limestone quarries.

In such quarries stone may be sold to steel and wire companies for fluxing, or stone may be burnt for either lump or hydrated lime, and there may be sales for building stone or rip rap. Only a small part of the entire product may be crushed. In such cases the quarry kilns and hydrating plant may be operated and shipments made while the crusher plant is idle. If during the regular season a larger amount of crushed stone can be sold than produced it would certainly be practical to operate the crusher a part if not all the winter, and store the crushed stone.

The advantages of doing some work in quarries during the winter are several.

Should workmen live a distance from the quarry, that is, are scattered, then by giving employment during the three or four winter months to the best of the men they can be held together, so that in the spring work does not have to be commenced with a green crew. Even if the men live close by the quarry in the company's own houses, they can be held more easily and made more contented by having some work during the winter.

One quarry company writes: "We

cannot say operating through the winter is a financially successful proposition, but we have always been able to get a liberal amount of business with the distinct advantage of keeping our organization together and give the men who are depending upon us for employment work through that season of the year. We feel that in justice to our men they are entitled to this provision on our part, so far as we can carry it out without any great financial loss."

This is a broad business principle that pays in most cases, for the writer knows from experience that it takes two or three months to break in new men in the spring and the loss sustained in this way can be greater than that of working men on broken time during the winter.

Repairs and alterations can always be made cheaper during the winter than when the plant is in operation. It should be the rule to overhaul all machinery and clean it up and paint it. Additions can also be made at this season of the year.

As to the ledge, it pays to do certain work on it. It is foolish to do stripping during the coldest winter months, but in the early winter and also early spring it is always possible, even in the northern sections, to do this work unless the soil to be worked is very light. To strip at this season means to make the drilling easier, and the production from the quarry is greatly increased during the regular season if men are not employed in handling the spoil.

During the season the ledge in certain places is bound to get into such shape as to prevent economical blasting. It is in the winter months that special drilling and blasting can be done in order to shape up the ledge.

Likewise, when the tracks are used it is at this season that the arrangement can be changed in order to save distance, thus saving trackage and the time of going over unnecessary distances with cars.

In fact, all of this kind of thing can be adjusted during the winter to give quick and economical results during the regular working season.

One difficult feature of producing crushed stone that cannot be sold during the winter is to store it so it can be handled economically when a sale is made in the spring. Not only does space but also money prevent the building of excessively large bins and a great number of them. To pile the stone in large piles upon the ground means an extra cost for piling and also for picking up the stone from these piles. With the proper conveyors and loading machines this storing and rehandling can be done at a low figure; yet the equipment may not be adaptable for use during the rest of the year, thus making it inadvisable to purchase much machinery for such uses. The storing must be decided for each quarry based upon the local conditions surrounding it. If these conditions prevent economical storing and handling it is advisable to eliminate the crushing beyond the limits of the ordinary storing capacity. If the conditions are favorable then as large an amount as the capital will allow can be crushed and stored.

Another method of working a quarry during the winter, when two products are produced, is to do the necessary blasting and take out the larger product, as rip rap, building stone or flux stone for which there is immediate sale and let the smaller pieces, to be crushed in the spring, lie upon the quarry floor until the crushed stone season opens. Then this is picked up and crushed. In order not to have the cost of rehandling all the stone, only the top part of the piles are gone over to pick out the larger pieces, the rest being left until the entire pile is picked up.

Handling Stone Twice

IT IS rather remarkable that in a large percentage of the quarries in the country when either carts or cars are used and men load these vehicles by hand, all the blasted rock is handled twice before it is loaded into the vehicles to be hauled to the crusher.

Today the cost of handling a ton of broken rock by hand is at least 25 cents, so that when the stone is handled twice, a quarter of a dollar is wasted on every ton. This is often as much as the profit made on a ton of crushed stone.

The reason for this re-handling is easily given. In Fig. 1 is shown a large pile of broken stone in a granite quarry. On the right, below the pile, a man can be seen. This man is a sledger, working at the toe of the breast. He is prying loose the blasted rock, and all small pieces he throws upon this pile. The larger pieces and the bowlders he breaks up with his sledge and then throws the pieces upon the pile. He has in the pile in front of him more than a hundred tons of rock. Another sledger is working on the same pile to the left, being out of the range of the camera.

When these two men started this pile the cost of piling the stone did not exceed 20 cents per ton, but when the pile had grown as large as it is and four feet high, the cost had become 32 cents per ton. With wages at 50 cents per hour, it can be seen that in a 10-hour day, each man piling was working at a rate of 25 tons in 10 hours, but as the pile became larger and higher the rate of piling was cut down to 16 tons.

The least work that a man does in foot pounds is that of raising loads from the ground. In other words, a man can cast or shovel more material, either earth or rock, in a horizontal distance than he can raise vertically.

Thus it is a wrong principle to make men load rock into high cars; as the men will, with the same energy, load less stone, than into low types of cars. Thus the car shown in Fig. 2 is the wrong kind to use for hand loading in quarries, as it is too high, yet this particular car is low compared to some the writer has seen used in quarries during the past season. A glance at the stone piles in Fig. 2 also shows how stone was sledged and piled in this trap rock quarry. Here too, money was wasted by handling.

Men paid day's wages, will very likely, if allowed to do so, pile stone into scattered piles, making another handling necessary; yet make it to their interest not to do so, and they will stop such piling at once. This was demonstrated a few years ago in a quarry with which writer had something to do. The men were paid day's wages for mucking up the stone and loading it by hand into low quarry cars. Several men sledged and piled the stone and other men loaded the stone from the piles into the cars.

It was decided to pay the men for the loading by the ton, and within a few days there was not a pile of broken stone in the quarry. The men of their own accord loaded the cars directly from the piles of blasted rock at the foot of the ledge, either breaking by sledge the pieces too big to load, as they were encountered, and throwing the pieces directly into the car, or rolling the larger bowlders to one side to be broken later with dynamite, or else breaking them between carloads when this was possible. Thus as a new car came down to be loaded, these pieces were ready to go on before any other stone was pulled down to be loaded. This proved to be a great saving to the quarry company.

This direct loading is the easiest way to overcome the second handling

Fig. 1—Showing stone piled in quarry. Man indicated by arrow

of broken stone at the ledge, but it means that each mucker and his "buddie" must do their own sledging. Some quarrymen follow this practice while others object to it, and at times wisely, for all laborers are not expert at sledging rock, although most can be taught how to do it. Thus the best sledgers only are used in some quarries, and these break up all the large stone. Even with this procedure it is possible to prevent rehandling, for the muckers can pull out the stones to be broken by the sledgers, who let the pieces be until the vehicles are brought to them for loading.

This means, though, that there must be ample room along the breast to change the men loading the vehicles, for after a load or two has been made, these men must work at some other place while a sledger breaks up the bowlders they have left. Two or three men cannot load stone while a sledger is working in their midst. They will either be afraid of being hurt by the hammer or pieces of broken stone, or they will stop work to watch the sledging, for it is a trait of human character to watch a man sledging rock, just as people will stop their work to watch a rapidly-moving train. There is a fascination in motion.

The rule should be to provide ample room for the sledger to work without interfering with the other work, and that a sledger should only move the stone he has broken when the pieces interfere with his work.

There is no use in handling rock until a vehicle is at hand to take a load. The pile of stone in the illustration looks impressive but it is not helpful in keeping the crusher running; the stone must just be picked up and loaded and this can be done just as well before being piled as afterwards.

Convention and Road School

Indiana Stone Men Will Get Busy This Month

THE executive committee of the Indiana Crushed Stone Association, consisting of A. B. Meyer, O. H. Binns, and L. H. Hawblitz, have decided to hold the annual meeting and banquet at the Claypool Hotel, Indianapolis, Thursday, December 16.

The first business session to be called promptly at 9:30 a. m.—the banquet to be held in the Florentine Room, Claypool Hotel, at 7 p. m. A number of prominent public speakers will appear on the program.

The annual Road School is to be held at Purdue University, Lafayette, Indiana, January 18, 19 and 20. It is expected that nearly every county highway superintendent in the state, as well as other county officials, will be present.

The county highway superintendents' program committee for the annual road school consists of: F. W. Connell, chairman, Indianapolis; Dave Sheetz, Benton County; J. S. Brown, Monroe County; H. M. McCaskey, Grant County; S. B. Mylin, Wabash; R. L. Chew, Vermillion; Wm. Zook, Fulton County; Mat Foster, Vanderburg.

Dr. W. K. Hatt, professor of civil engineering, Purdue University, will have charge of the Road School.

Convention in December

Indiana Is First of States to Hold Annual Gathering

THE executive committee of the Indiana Sand and Gravel Association, at a meeting the early part of November fixed upon Dec. 1 and 2 as the dates of the annual convention. This action was taken in order that President H. C. Huffstetter might be present, a privilege that had been denied him for the last four years, by reason of his absence at the time the meetings were held.

In sending out notice of the convention, President Huffstetter says:

"I think this an opportune time to call the attention of the members of the association to the necessity of making the attendance record at this meeting 100 per cent for the following reasons:

"This year has been an extremely strenuous one for our industry because of many deterrent forces that militated against the business as a whole. The car supply, the freight rate, the specifications, and many other problems have confronted the association and had to be met oftentimes from this office without time being available to consult with each individual producer. And now, with these problems still pending and the future of the association at stake, every member should feel it incumbent upon himself to be present at the meeting and assist in solving the problems and in the establishment of the status of the association upon a more stable basis.

"I urge that each member bring his wife to this meeting and provisions will be made for the entertainment of the ladies at the annual dinner."

Texas Producers Unite

Recently Formed a State Association at Waco—Strawn Is President

TEXAS aggregate producers have perfected their state-wide organization, under the name of the Texas Sand, Gravel and Crushed Stone Association. Final steps in perfecting the organization were taken at a meeting held at Waco, Texas, which was attended by sand and gravel dealers from all parts of the state, as well as officials and representatives of the National Association of Sand and Gravel Producers.

Branches in Dallas, Houston and San Antonio were first organized, and then about these city branches as a nucleus, the state organization was formed.

Officers for the state association as elected at Waco are: J. G. Strawn, Dallas, president; J. F. Morris, Gainesville, vice-president; Rhea Miller, Dallas, secretary and treasurer.

The executive committee consists of the president and the chairman of the following committees: Membership, E. L. Dennis, San Antonio; Transportation, E. Eikel, New Braunfels; Specifications, J. J. Potts, Waco; Entertainment, Miss H. J. Cummings, Houston.

Each standing committee consists of five members, the chairman and four members to be designated later by the president.

The association voted to hold meetings at intervals whenever there is something of interest to the membership to be discussed. The next meeting will be held in San Antonio early in January.

One of the first matters to be taken up by the association will be transportation conditions with reference to rates and inadequacy of the car supply.

Electricity in Pits and Quarries

The Second of a Series of Articles
By DANIEL J. HAUER

IN A former article on this subject, printed in the October issue of PIT AND QUARRY, mention was made of obtaining power from a central power station, and also the possibilities of hydro-electric development. Lacking these it was suggested that a steam plant could be built for the generating of electric current. Some additional comment upon this part of the subject should be made in order to illustrate when such practice is both economical and practical.

For a small, compact plant where machines and conveyors are within a limited space or area and steam must be used, it would be rather expensive for such an installation to generate electricity, and steam can be used with but little waste, but in a quarry or pit where the various units of the plant are much scattered or where several plants and two or three pits are operated, so that there would have to be a number of different boilers to which water and fuel would have to be supplied, then it is wise to consider generating electricity. It at once becomes logical to establish a central plant, generating power and transmitting it by wires to any machine that needs it for operating.

For many machines that must be moved frequently, electric power is especially well adapted for use in pits and quarries, mainly on account of the flexibility with which the power can be transmitted, as it is always very easy to bring temporary lines to the machines to be operated and change these lines as the work progresses.

Electrically driven machines are usually lighter than air or steam driven machinery, and therefore capable of being moved from one location to another easily and with little expense. There is less loss of power in transmission from power house to the machines than with either steam or air and furthermore, the power lines are not affected by the vicissitudes of the weather.

Earth and rock excavating machinery of all kinds can be operated by electricity. Thus for excavating sand and gravel from pits, electrically operated excavators can be used; while for stripping off the over-burden in quarries as well as handling the blasted rock from the ledge, power shovels operated with electric motors have been used for some years.

The operation of power shovels by steam has been a success for more than sixty years, when James Otis of Boston, first brought out his crude steam excavator. The improvements in shovels since the first model has been great, and it has not been easy to shift over from steam to other power, for the service demanded from a power shovel is severe in the extreme, and all parts of a shovel must be of rugged construction to stand up to the work. Electrical engineers have seen to it that the electrically operated shovels are able to perform such service satisfactorily.

The first shovels to be operated by electricity were known as the "friction drive electric." These were operated by a single constant speed motor with friction clutches. These were somewhat along the line of applying steam power in the early build of shovels, with one set of engines only, and using friction clutches for the other work. Such shovels could be operated as cheaply as steam, but they did not compare favorably with steam as to speed, as they were much slower in action and much harder on the operator.

The modern electrical shovel has

multiple motor direct current or alternating current equipment. Thus there should be one or more motors to operate the hoists, a motor to swing the engine, another for the thrust of the dipper, and in some cases, another for propelling the shovel. It must be remembered that the duty cycle of a shovel is short and consequently severe; the hoist and thrust is less than ten seconds, while the swing is but little longer, a shovel being speeded to make from two to four complete cycles of work in a minute. The motors used should have a low armature inertia to allow of rapid acceleration and quick reversals under limited power. The thrusting motor or engine is usually worked until it stalls or the load is picked up by the dipper, making hard service on a motor.

The greater demand is for alternating current motors over direct current, as they are more nearly a constant speed motor than the direct. When conditions are encountered in shovel operation, as they are at each thrust of the dipper arm, as to put a heavier load upon the machine, the reduction in speed caused by this load gives an increased torque to the motor, thus enabling the motor to carry the overload up to a certain limit, at which point the motor may stall, but can be quickly reversed. With two motors as on the hoist, the reversal can be made quicker and with less waste of power.

The initial cost of installation of alternating current is lower than direct current, there is also a saving in operating expense for both power and maintenance, as shown in quarries and mines, and it is stated there is an increased factor of personal safety.

Although the cost of an electrically operated shovel is higher than one run by steam, yet it must be considered that the cost of coal is entirely eliminated, that a fireman is not needed, nor a watchman at night to keep up steam during the winter to prevent freezing, nor are teams needed to haul coal to the shovel, nor does water have to be pumped to the shovel or hauled in wagons. Then, too, it must be remembered that boiler and fire-grate troubles are eliminated, and there is a material increase of wear and tear of parts having a transverse motion as compared with those having a rotary motion.

The saving, though, in operating expense of any machine of electricity or steam must depend somewhat upon the comparative cost of coal and electric power in different localities.

Although most well-drilling machines have been operated either by steam or gasoline, yet it is perfectly practical to use motors for drilling deep well holes with such machines. With the present high price of gasoline and the unusual demand for it for trucks and automobiles, the substitution of other power for gasoline is welcomed by most.

As with a steam shovel, a cable is run from some pole where the cable is attached to the overhead wires, to the machine, and as the machine goes from place to place this cable is shortened or lengthened.

As long as desired, the operator with electricity is assured of continuous action, and the entire expense for power is cut off the instant the machine is shut down. Unlike gasoline, there is nothing to evaporate between working periods.

Most percussion drills are either worked by steam or air. The hammer drill has almost supplanted the larger air or steam drill set up on a quarry bar or tripod, so that most of these drills are now run by air furnished by a compressor plant. The objectionable feature of steam in a hammer drill is the escape of steam into the air among the operators. In addition to this, the entire tool heats up from the steam, making it objectionable to operate.

Electricity is a great aid in drilling, in doing away with a central compressor plant. It becomes possible to have one or more portable compressors for use in the quarry close to the point where drilling is to be done. This saves a great waste of power in transmitting it through pipe lines and prevents any changes in temperature from effecting the work. Where only a few drills are to be used, a much smaller ccompressor plant can be used. In widely separated quarry breasts, it is possible to cover all the work with two or three small units.

At one time in quarry and mine work, electric air drills gave promise of a great future. These were operated by a small portable electrically driven compressor, the drill being set up on a tripod. Although some of this type of drill are still used, this, too has very generally been supplanted by the more flexible operating hammer drill. In some of the large quarries, the electric air drill is still used.

In the best marble quarries the use of explosives has entirely disappeared, all the marble being quarried or mined by the use of machinery. Besides the drills used in connection with plugs and wedges, channellers chisel the blocks of marble from the ledge. These machines, fairly sawing out large blocks of stone, have been operated in this country by electric motors for about twenty-five years.

Here has been an excellent opportunity to see how electric motors can withstand the rough usage of the quarrying machinery, and also how little the motors have been injured by the constant vibration of machinery, for channellers fairly quiver from their work. There are a number of records of the heavy railroad motors used on channellers being in excellent condition after twenty years of work, with little or nothing spent upon them for maintenance.

The same results have been obtained in operating channellers in monumental granite quarries.

One of the first places to operate electric derricks was in quarries. Although in some quarries the derrick service is almost continuous, yet in most quarries it is intermittent, so that an electric derrick is always ready for use, yet there is no loss of power due to maintaining steam or by banking fires. There is no limit to the size of derricks that can be operated by electricity.

Gantry cranes for handling and stocking marble or for stock piles of coal or stone are also more economically operated by electricity than by steam. Here, too, is where intermittent service counts in favor of the electric motors.
tures that have been commented upon for derricks and gantry cranes apply to these machines.

In many quarries as well as pits, pumps must be operated to take care of the surface water, and also much underground water. Such pumps must be worked day and night in some cases. This means continual service on the part of some mechanic when steam is used, while with electricity the service goes on for the twenty-four hours in the day without attention, except for lubrication.

Before leaving the work at the ledge, it may be worth while to state that drag-line excavators and similar machines used for stripping the ledge are, like power shovels, operated successfully by electricity.

The use of electricity for transportation in pits and quarries is a subject of such an extent as to reserve it for another article.

The Henderson Sand & Gravel Company, Henderson, Ky., has been incorporated with a capital of $25,000 to operate sand and gravel properties in this section. The company is headed by W. C. Cooper, L. A. Cuttingham and G. Givens, Henderson.

Pit and Quarry

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Moving Freight Cars by Hand

IN A RECENT article in PIT AND QUARRY, in regard to operating a plant, it was stated that one man was employed to pinch the gondola cars ahead as they were being loaded by means of a belt conveyer. A bar was used for this purpose.

It is a common part of the work in loading railroad cars in both the crushed stone and gravel and sand business, to have to move cars ahead, not only when the actual loading is being done, but afterwards, so as to make space for a new car under the loading apparatus.

The modern car having a capacity of from 40 to 70 tons is very hard to move and on anything but a down grade it is almost impossible to move such loads with the ordinary pinch bar. It frequently takes from one to ten men to move such cars with bars.

It is time for pit and quarry men to do away with the use of bars for such work. For a number of years there have been on the market several makes of car movers. These are patented lever arrangements that one man can operate and move a heavy freight car with great rapidity as compared with pinch bars. They are used for moving cars either up or down grade and quickly pay for themselves.

If you do not use these car movers, get two of them, so as to have one in reserve in case the one in daily use is broken. You will please your men and save time and money.

Foundations for Machinery

IT IS quite surprising that so many quarrymen and pitmen set up machinery on insecure foundations. This is a great mistake as the machines are injured by such a procedure and the amount of work is cut down.

Recently the writer saw a plant where the crusher had such play on its foundations that the crusher fairly rocked, and at times the belt came off. The capacity of the crusher was cut down, and certainly the bearings were being injured, due to the uneven motions of the belts, wheels, and other bearings.

In another case a pump was found rocking so that it moved the entire pipe line, injuring the joints and other connections.

Motors and engines have been found in the same condition.

In quarries and pits it should be an easy matter to have secure foundations, for there are plenty of materials, stone and crusher dust, gravel and sand, and with cement, the best kind of foundations can be put in place. Such foundations should be carried down to rock or into solid ground and then built up with concrete, the size being such as to give a broad foundation without interfering with the operation of the machinery. Anchor bolts should be imbedded in the concrete as it is being placed.

If foundations have become insecure, this is the time of year to tear out old foundations and place new ones. Timber foundations are only makeshifts, concrete being much more permanent and even better than stone masonry. H.

Better Times in Chicago

IT looks as though matters were on the mend in Chicago, so far as construction is concerned. The city's long agitation against jurisdictional strikes chystallized during the past month into a signed agreement by officials of the Chicago Building Trades Council to arbitrate all disputes between now and May 1, 1922. At the same time a written promise was made not to ask for higher wages at the expiration of present contracts.

With these two important steps as first aid to housing and building in general came the announcement that the unions agree to deliver efficiency in their work and that the contractor's right to fire men who soldier will be sustained by the Building Trades Council.

"With labor stabilized, jurisdictional strikes cut out, and men doing a full days' work in eight hours, Chicago ought to see a wave of building," predicted Adolph F. Kramer, president of the Chicago real estate board.

"One of the most important features of the conference," said Henry G. Zander, chairman of the committee, "is that the unions have promised to see that their men work, and any man who loafs on the job can be fired by the contractor without fear of having a strike the next hour."

A statement issued after the meeting reads:

The general situation that confronts the people of Chicago and our country as the effect of the war has received the serious and thoughtful attention of the labor unions as well as other interests in the community.

The labor unions recognize the difficulties that come with the reconstruction and readjustment of the present unusual and unprecedented conditions. As interested and loyal citizens it is the desire of the unions to help to their fullest extent in the solution and adjustment of the problems and difficulties which the conditions present.

And while others are doing and desiring to do their share, the unions, after deliberation and consideration of the various phases of the situation as it affects them, and with particular consideration of the needs of the business community, have reached a decision and are ready to put into effect an agreement: To continue the present wage scale after May 1, 1921; abolition of all jurisdictional strikes on the part of all trades affiliated with the Chicago Building Trades Council, and the readjustment of same by the council grievance committee, all trades to remain at work pending decisions; the reaffirmation of all existing present agreements and the intention to abide by same until the expiration of same.

The Missouri Portland Cement Company has experienced such a large increase in its volume of business in the territory controlled by its Memphis, Tenn., office—located in the Union and Planters Bank Building—that they have bought 250 acres of land on Wolf River, near Chelsea and Evergreen, for an additional sand and gravel producing plant and a distributing yard for building materials. Mark Fenton, of the Chamber of Commerce of Memphis, who helped to move the enterprise, is authority for the statement that this new plant will involve the investment of about $200,000. The company's plant at Nonconnah, on the Mississippi River, will continue its operation also. This company's principal office is at Kansas City, Mo.

The Beverly Stone & Sand Company, with its main office at Knoxville, Tenn., was recently incorporated under the laws of the state of Tennessee, with a capitalization of $25,000. Its incorporators are Charles M. Seymour, who is also secretary of the company; T. G. McConnell, A. L. Mason, Ben H. Testerman and E. M. Richards. This company purchased the leasehold interest, machinery and equipment of the Beverly Stone Company, Beverly, Pickens Co., S. C. The motive back of the organization of this company is the operation of the granite quarry of the above mentioned company, the product of which is crushed stone for ballast and commercial purposes. This company has the same ownership and controlling interests as the Wauhatchie Limestone Company, Chattanooga, Tenn., and the Holston Quarry Company, Knoxville, Tenn.

Demurrage in Nebraska

Sand and Gravel Men Oppose Additional Burdens

ON November 23 the Nebraska Railway Commission held a hearing at Lincoln, upon request of the carriers for demurrage rulings which would impose additional burdens on shippers.

Trenmor Cone, of the Consumers Sand Company, Valley, Neb., appeared for that company and for the Central Sand Company of Central City.

In addressing the commission, Mr. Cone said:

"I wish to hereby join the Nebraska Mineral Aggregate Association in their protest against any additional increases in the war-time rules and regulations applied to demurrage now in effect; the major portion of them being unreasonable for peace time conditions.

"The sand and gravel shippers are today loading and unloading their product in this state with almost 100 per cent efficiency. The delays now in this commodity are almost entirely through side-tracking these non-perishable materials enroute and at terminals to advance all other car stuff in preference, notwithstanding the fact that Nebraska sand and gravel rates are more per ton mile to the carrier than other car load commodity rates, based from origin to destination, except common rock, brick, and dynamite.

"No commodity of prime necessity has been subjected to so many rules, orders, and regulations as ours; amounting at times to such injustices and discriminations in applying arbitrary conditions to our business that patience almost ceases to be a virtue.

"Enough crimes have been committed, and far too many usurpations, in the name of the people by these rate and rule makers in their fixed purpose to validate watered stocks and bonds of our carriers.

"It is time that they in common with all other industry be compelled to turn their faces about and proceed to lower levels.

"Reason demands that the original freight rate shall include enough for expeditious loading and unloading and that unavoidable delay beyond this should carry a charge equal to the interest and upkeep, etc., on a car, which the carriers among themselves have found to be $1 a day.

"Beyond this, just compensation to the carrier, there must be one added to the willful, careless, or indifferent abuser of service; but your protestant respectfully submits that fines, licenses, and penalties belong in the school funds rather than in the pocket of the judge imposing them.

"Your petitioner further represents to you that the side tracks of most railways are now filling up with all kinds of empty cars and that you adjourn this hearing, and invite our carrier brethren to go home with every endeavor to provide these empty cars for every available service in bringing order anew."

For the third successive month, class one railroads of the United States moved more freight during September than was ever transported in a single month either during government control or the pre-war period, according to data just compiled by the bureau of railway economics. The net ton miles (the number of tons of freight multiplied by the number of miles there were carried) totaled for September 40,999,843,000. This was 1,706,992,000 net ton miles less than the total for August, but was 564,335,000 greater than the net ton miles for July, which, according to the interstate commerce commission were greater than for any month previously recorded. The total for September also exceeded that for the same month last year by 2,139,532,000.

Chutes for Pits and Quarries

WHEREVER possible, gravity chutes should be used in pits and quarries to convey the various products. There are three considerations that must be given to the building of chutes, namely: the angle or incline of the chute; the material to be used in building; and the protection to be given to men and machines that may have to work near the chutes.

Chutes that are steep enough to carry stone will allow some of the stone to jump out unless the chutes are very deep. Inasmuch as the cost of deep chutes is excessive, they are made a little more than the carrying capacity needed. Then, to protect workmen who may be placed near the chutes, covers must be used over them. These can be made of lumber or wire netting, of old pieces of screens or old corrugated wire sheets. It is possible to kill a man with a fairly good sized stone jumping from a chute, while serious injury can be inflicted with small stones.

Chutes around crusher foundations and other concrete structures are generally built of concrete, but it is advisable to line the bottom and sides with steel plate. Wooden chutes should be built in the same manner.

Steel chutes are not used so extensively, but they are seldom more costly than wooden ones when the extra cost of cutting and placing the steel lining in a wooden chute or trough is considered.

The stone quickly wears the concrete and wooden chute, and so roughens it as to retard the movement of the material. Stone, sand and gravel move much easier on steel or iron than on other materials.

Crushed stone should have chutes built on an angle of at least 52 degrees, this angle being measured as shown in Fig 1.

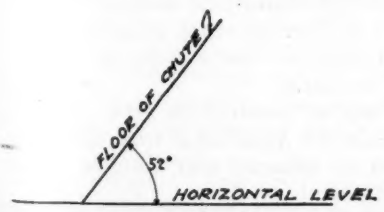


Fig. 1—Showing angle to measure in building chutes

Fig. 2—Showing baffles in chute.

For larger stone this angle should be from 55 to 60 degrees, depending upon whether the stone breaks into angular pieces or is inclined to break into flat slabs. These slab pieces need a sharper angle.

Wet sand needs an angle of about 50 degrees to keep it moving, while very dry sand will move in chutes with an angle of 40 degrees or less.

Very round gravel will keep moving at an angle of 35 degrees, while more angular pebbles need as great an angle as 45 degrees.

Sand can be transported a long distance in chutes or troughs with water.

Such chutes do not have to be at a very acute angle; less than 20 degrees can be used. In order to keep the sand from settling in the bottom of the chute or trough, baffles must be placed at intervals on each side of the trough, as shown in Fig 2. This gives the current of water added velocity and so agitates the entire flowing mass as to keep the sand stirred up in the water and moving. With a supply of water furnished at small cost, this is a cheap method of transporting sand even for long distances.

Such a trough as this does not have to be lined with steel.

Good Prospects for Road Building in 1921

By Our Washington Correspondent

ALTHOUGH neither the Bureau of Public Roads of the the Department of Agriculture nor the Highway Industries Association at this time has any definite information from the states regarding the amount of money that will be spent in 1921 on road building, opinion seems to prevail among officials of these two organizations that next year will be a banner year, and that road building in every state in the country will be on an extensive scale.

There are several reasons for this belief. In the first place, the states have not "caught up" in their road building programs abandoned during the war; in the next place, money has accumulated in a great many of the states as a result of discontinuation of building during that period; and again, materials probably will be easier to obtain and labor probably will be cheaper. Conditions are said to be better, at this time for an extensive building and repair program than they have been since this country entered the war.

The Bureau of Public Roads roughly estimates that next year there will be $550,000,000 spent on new roads and old roads in this country. This estimate is based on "past performances," as it were. That is, based on the increase in road building since the armistice was signed and that character of construction was revived. If the increase continues next year in the proportion it has shown during the past two or three years the amount spent should approximate the figure estimated by the Government bureau. On the other hand there are reasons to believe that this amount may be exceeded, according to those close to road building in this city. The principal reasons are the ability to obtain materials and the lower cost of labor.

Reports from the states on their road building programs, made to James W. Brooks, in charge of the Education Bureau of the Highway Industries Association, and H. G. Shirley, secretary-treasurer, former highway engineer for Maryland, fail utterly to give any definite idea of what the states propose to do. Out of questionnaires sent to every state in the union, only 17 replies have been received to date and five of these replies made absolutely no statement as to the amount of money they will spend. The other 12 replies give an approximate amount, however, while all assert they are waiting on this winter's sessions of their respective legislatures. Forty-one legislatures hold sessions this winter, in most of which action on appropriations for road building is expected to be taken.

Replies received by the Highway Industries Association from the states and the amounts they indicate will be spent are:

Michigan, $16,000,000; Oregon, $10,000,000 for new roads and $7,000,000 to

complete contracts now under way; Indiana, $5,000,000; Delaware, $2,000,000 with hope for more from the coming session of the legislature; West Virginia, $7,000,000 for new roads and maintenance; Oklahoma, $10,000,000; Maryland, $4,800,000 for new roads and maintenance; Illinois, a little less than $14,000,000 roughly estimated; Missouri, $1,600,000; Alabama, $4,000,000 to $6,000,000; South Carolina, $5,000,000; Nebraska, $4,000,000. Replies were received from North Carolina, New Hampshire, Pennsylvania, Kansas and Rhode Island, but they gave no intimation of the amount they would spend.

It was noticeable in all of the reports that reference was made to the difficulty of getting materials and to the high price of labor. With the railroad situation admittedly better, and with a promise of it being practically normal next spring and summer, the difficulty in obtaining materials should be largely overcome. As regards labor, the shutting down of so many industries should make road building labor somewhat cheaper, it is pointed out. Maryland road officials have announced, in this connection, that they are going to offer 25 cents a day less next year, and that they expect to have an abundance of labor.

It is thought that a great deal more money will be spent in some of the states than is indicated in the reports to the Highway Industries Association officials. For instance, Mr. Shirley says he has personal knowledge to the effect that Pennsylvania and Illinois have millions on hand as a result of the war period abandonment of their road building programs, and he suspects that Maryland is in the same position. It is admitted that much will depend on the action of state legislatures this winter.

On December 13, the American Association of Highway Officials will meet in this city, and it is anticipated at that time a more definite idea of what the states will spend, or expect to spend—with affirmative action of their legislatures—during next year will be available. It is expected at least that estimates of these officials will be available at this meeting, along with the prospects of putting those estimates through at the coming sessions of the legislatures.

In order to show what some states now have available, through bond issues, for road building next year and the subsequent few years, the following tables were prepared by the Bureau of Public Roads for PIT AND QUARRY:

State Highway Bonds Authorized Since November 1, 1918

Alabama	$25,000,000
Illinois	60,000,000
Michigan	50,000,000
Pennsylvania	50,000,000
California	40,000,000
Oregon	22,500,000*
Maine	10,000,000
South Dakota	4,500,000
Utah	4,000,000
Wyoming	2,800,000
Nevada	1,000,000
Maryland	3,000,000

State Highway Bonds Reported as Probably Approved November 2, 1920

Minnesota	$75,000,000
Missouri	60,000,000
West Virginia	50,000,000
Colorado	5,000,000
Idaho	2,000,000

*$2,500,000 contingent on appropriation of equal sum by federal government.

Under the heading of "Bonds authorized since November 1, 1918" it is estimated that about one-fifth of the total amount will be available in 1921. That is going on the theory that the issue is to cover a five-year period. As the total issues amount to $272,000,000 the 1921 portion should be a little more than $90,000,000. As regards "Bonds Reported as Probably Approved November 2, 1920" there exists some doubt as to what period these issues will cover. Also the Bureau has not yet received assurance that these issues were approved, though the election is more than a month past.

After a big blast.

Plant Story in Photos

One of Chain of Quarries of Well-Known Company

THE illustrations on these pages, as well as those on pages 72 and 73, are from one of the plants of the Columbia Quarry Company of St. Louis. This is the company with which is associated E. J. Krause, vice-president of the National Crushed Stone Association.

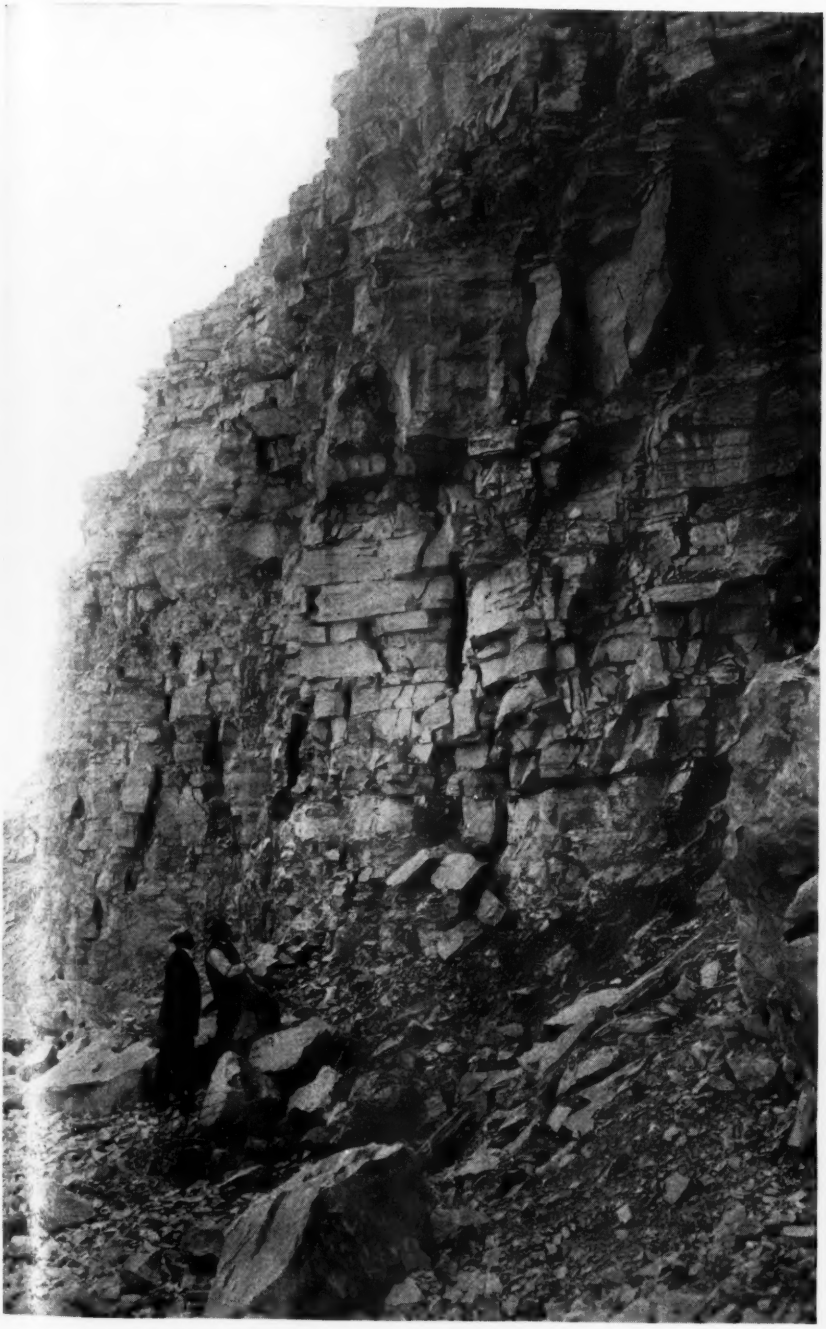
This plant is located at Krause, Illinois, on the Mobile and Ohio Railroad, just south of East St. Louis, and is one of five plants operated by this company in Monroe, St. Clair and Madison counties in Illinois.

This plant is equipped with a No. 12, No. 8, two No. 5's and one No. 3 Allis-Chalmers gyratory crushers, and three large Allis-Chalmers revolving screens. One of these screens is installed between the No. 12 and No. 8 crushers and removes all foreign matter, if any, to a bin, from which bin it is loaded into dump cars and wasted. The other two screens are used as sizing screens for commercial stone.

This plant is also equipped with two American ring-hammer pulverizers and three vibrating screens. One of the vibrating screens is used to screen the product from the pulverizers. At present two sizes of ground limestone are made. The two other screens are used to thoroughly screen the smaller sizes of crushed stone.

The plant has two railroad track scales, one located at each track, underneath the bins. This system admits of weighing all cars when empty and loaded.

The plant is electrically operated and each machine has its own motor.



Ninety-foot quarry face of Columbia Quarry Company

PLYMOUTH

Gasoline Locomotives

Industrial Dictionary

PIT---A natural or artificial hole or cavity in the ground, especially when relatively wide and deep.

QUARRY---An excavation from which stone is taken for building or other purposes. Distinguished from mine by being widely open at top.

PLYMOUTH---An industrial locomotive manufactured at Plymouth, Ohio, and distinguished for its sturdy construction, its long life, and matchless service. Especially adapted to pit and quarry industries.

HAULAGE---An industrial problem especially acute under present conditions, but easily solved by the installation of a Plymouth Gasoline Locomotive.

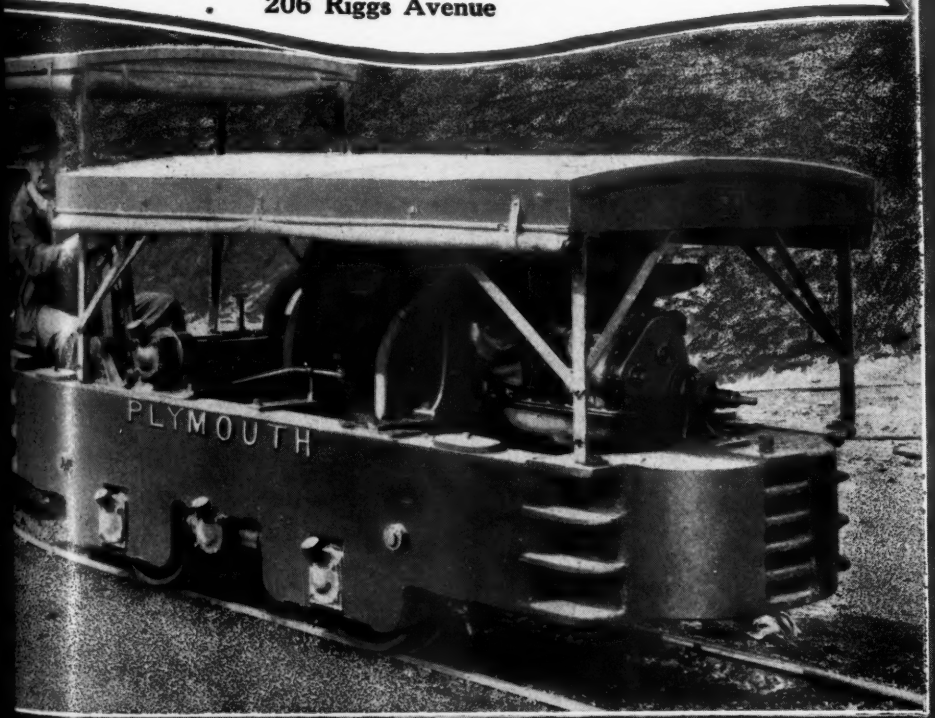
SATISFACTION---A feeling of relaxation and content, particularly enjoyed by Pit and Quarry owners who have shifted the haulage burden to the Plymouth Gasoline Locomotive.

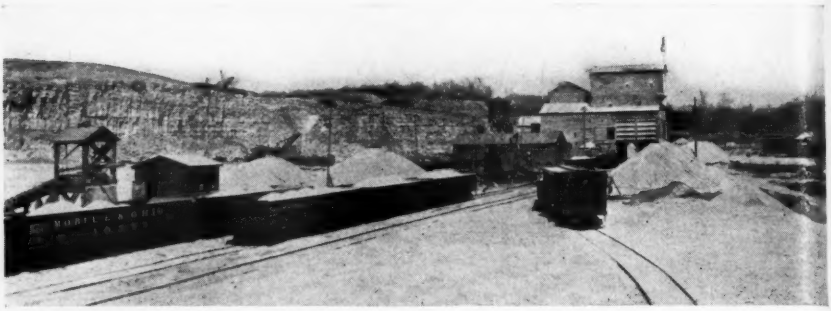
RESEARCH---Digging after facts, particularly exemplified by those who write for Illustrated Bulletins on haulage, issued by

THE FATE-ROOT-HEATH CO.

PLYMOUTH, OHIO.

206 Riggs Avenue

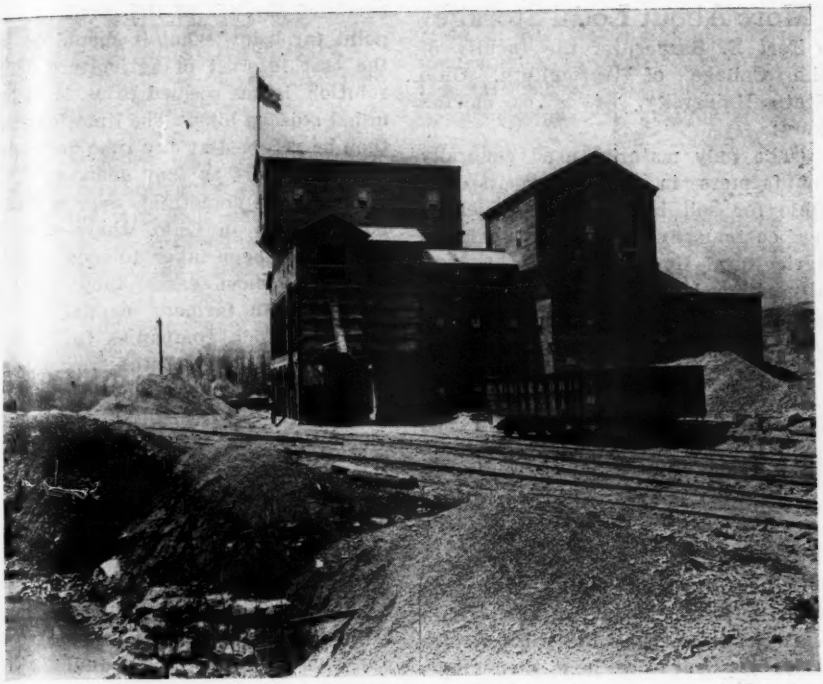


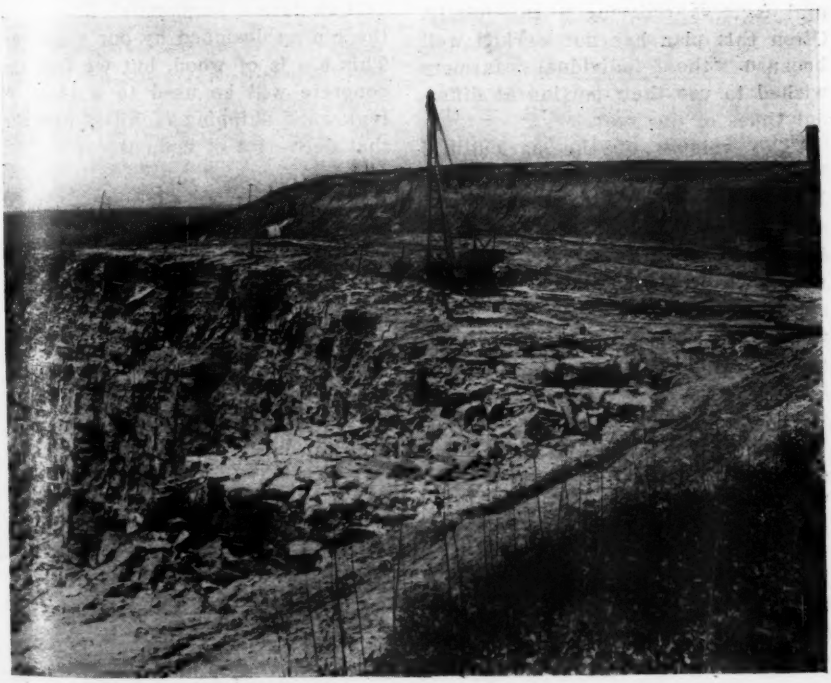


Loaded cars moving by gravity from plant to storage tracks and grounds

Pulverizing plant at one end of grounds which takes care of tailings

Quarry side of crushing plant





Columbia Quarry Company. Lower view shows top of quarry, stripped with a 70-ton Bucyrus Shovel and drilled with three Cyclone Well Drills

More About Local Storage

Earl E. Barnes, of the faculty of the College of Agriculture, Ohio State University, writes us as follows:

"The only material used generally by farmers in large quantities in Ohio for soil improvement which is not customarily shipped in sacks is agricultural limestone. This is usually shipped in bulk in either open cars or box cars. To minimize handling, farmers have been in the habit of ordering for delivery at such a time as they could haul directly to their farms. In many cases it has gone directly to the field. Many difficulties have appeared which are at present greatly curtailing the use of lime.

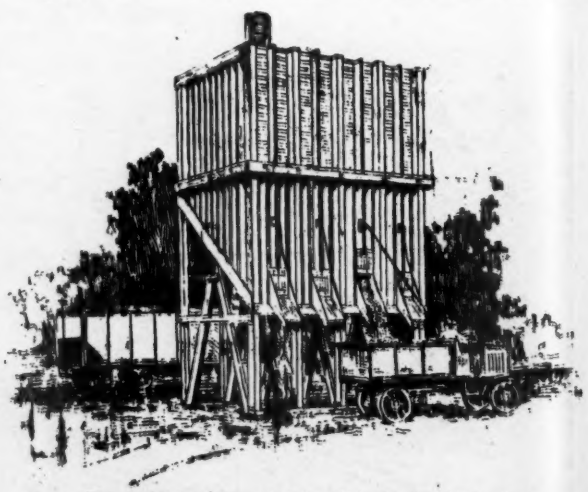
"Most farmers are not equipped to take care of a car of lime by hauling directly home from the car within the time allowed by the railroads for unloading a car without demurrage. This has in the past necessitated several farmers ordering a car jointly. Often this plan has not worked well because the individual farmers wished to use their portion at different times of the year.

"The volume of the agricultural limestone business has now reached such a stage that it is impossible to get deliveries when desired or in many cases when it is possible to haul to the farm because of the condition of country roads. Moreover the farmer is not equipped to store the limestone when it reaches the farm, if it must be kept on hand long before spreading. These conditions have thus curtailed the use of this product to a point far below what it should be for the best interest of agriculture. The solution, it has seemed to us, is in terminal storage bins. The limestone can then be received at any time and doled out to farmers as they demand.

"We have something over a dozen communities in Ohio where definite steps have been taken to secure these bins. In most cases they will be erected with farmers' capital by organizing stock companies to be controlled by a board of directors elected from the stockholders. The Rural Economics Department of Ohio State University has co-operated in helping the farmers to get their organization under way and the Department of Agriculture Engineering has prepared plans for their construction.

"Limestone is the commodity they will handle at first but these companies are being so incorporated that they can expand and handle other materials if they so desire.

"I enclose a perspective drawing of the bin as designed by our engineers. This bin is of wood, but we feel that concrete will be used to a large extent when shipping facilities are such that deliveries of cement can be had."



Type of bins suggested by Ohio State University

Examples of Excessive Secondary Blasting Costs

A NUMBER of instances have been noted by the Bureau of Mines where the cost of secondary blasting was excessive. It may be instructive to quarrymen to review the probable causes of the high costs, in order that inefficient methods may be recognized and avoided.

In one limestone quarry observed, more explosive is used for secondary than for primary blasting. Two causes may be assigned. First, the rock is seamy, and hence many large, solid masses are thrown down. Where such conditions prevail, the quarryman may find some useful suggestions on pages 50-51, where blasting in unsound rock is discussed. In the second place, the high cost partly due to hand loading, for the rock must be broken into small pieces to be loaded by this method.

In a limestone quarry in the Middle West, excessive secondary blasting is required because the rock is very hard and is thrown down in large solid fragments by the primary shots. Tripod-drill holes are placed 5 feet apart and with a 6-foot burden on 32-foot benches. The explosive employed is 40 per cent "straight" nitroglycerin dynamite. Larger and more widely spaced holes made with a churn drll or wagon drill would probably give better results, especially if "60 per cent" dynamite were employed.

In one southern limestone quarry as much explosive is used for secondary as for primary blasting. Apparently, this is due chiefly to the fact that the rock is loaded by hand and must be broken into pieces much smaller than is necessary for steam-shovel loading.

In several quarries visited by the writer, the high cost of secondary blasting is due chiefly to the employment of the wasteful and inefficient mud-capping method. The introduction of the block-holing method would greatly reduce the amount of explosive required.

NO one conducts a business for the fun of it, but for the profit that is in it, and hence the object is not gained unless your product is sold at a reasonable profit. But a bad debt loss on one contract will dissipate the profit on ten contracts of equal tonnage; so it can be readily seen that it will not take many losses to dissipate your profits—and one big loss may do it.

ALTHOUGH the total volume of business is lessening, commercial operations seem to be on a very substantial basis and the let-down from the high points in both volume and prices is being accomplished with the minimum of business disorder.

D. L. Stull, Trussville, Ala., has acquired the local properties and equipment of the Alabama Silica Products Company, and plans for extensive development and production, particularly in the line of high grade sand.

The Gray Knox Marble Company, Knoxville, Tenn., is negotiating for the purchase of several companies engaged in marble and affiliated production in this section, with view to consolidating the interests. The company has total holdings of its own totaling about 200 acres of marble land. The capitalization of the organization was recently increased to $500,000 for proposed expansion. J. B. Jones is president.

How To Cut Belts

Engineer's Suggestions for Eliminating Much Trouble and Wastage of a Valuable Product

By F. D. RICH
Sales Engineer, Crescent Belt Fastener Co., New York.

HUMAN nature plays an important part in getting service and longer life out of a belt. It is human nature to do things in what seems the "easiest way," not always realizing it is often the most expensive and usually the most laborious, because it necessitates doing the work over and over again. This applies particularly in the case of cutting belting and joining it.

Cutting the ends of a belt to put it into service seems such a simple thing that often the belt man does not give it the consideration necessary to insure the best results, and much of the difficulty with otherwise good belts is due to their not being cut and joined accurately. When you know how, it is as easy to make a belt joint which will run the same as endless, as it is to do it by careless rule-of-thumb methods.

When a belt runs "wobbly" or races back and forth across the pulleys, it is not giving its best service nor can it have its longest life. If you have a belt that is repeatedly jumping off the pulleys, you are paying about twice as much as you should for it, because its life is being shortened and you are paying for power that is lost and production that you don't get. You are also repeatedly paying for unnecessary time and labor in fixing things up.

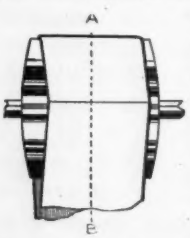


Fig. 1—A belt joined this way cannot run true and evenly.

Provided that its ends are cut square and it is joined with care, a belt can be made to run as straight as an arrow if the pulleys are lined up true.

Don't guess at cutting your belt ends. Use a square—always—and use it with care. If you do not use a square, one or both of the ends will be cut unevenly or irregularly, which prevents smooth running. Even the use of a straightedge does not assure the perfect results obtained by using a square, for the slip of a fraction of an inch will bring the belt ends together at an angle, as shown in illustration No. 1.

This results in the belt "shimmying" on the pulleys, which is bad for the belt and impairs its service, for as it moves from side to side, the line of direct pull, A B, moves from one side of the belt to the other imposing shifting and irregular strains, which no belt can stand indefinitely.

Fig. 2—Hold the square tightly against the edge until you have cut all the way through the belt.

There is only one way to assure correct results. That is to use a belt square and to keep it in place until you have cut all the way through the belt. Don't just scratch the surface and then hack through. Cutting to the square assures an even cut all the way through the belt and all the way across. It means that the belt ends can be brought together in a tight, butt, evenly-running, flush joint.

For belts up to 15 or 18 inches wide you can use the ordinary square. Press it firmly against the edge of the belt,

and, when cutting, hold the knife vertically. See illustration No. 2.

Be sure your knife is sharp. Wet the point of your knife occasionally, as it cuts more easily when the blade is wet.

When a number of belts have to be cut, a good stunt is to drive two nails in a large block of wood, and against these set the edge of the belt and the edge of the square, as shown in illustration No. 3. This prevents either the belt or the square slipping. Some men tack a slip of leather or a piece of old belt on the end of the block to protect the point of the knife as it comes through the belt.

Fig. 3—This simple stunt makes square cutting easy and positive.

Wide belts are more difficult to square correctly, and the difficulty is often increased by slight variations in width, which throw the square out. To avoid this and assure perfect results, the method described below has proven the best.

At any point near where you are going to cut the belt measure across and find the center, as at A A, illustration No. 4. At any distance back of this, 2 or 3 feet, find the center again, as at B B. Between these two center points draw a clean, sharp line. This marks the center axis of the belt.

Now, as in illustration No. 5, using the square against the center line, trim off the end of the belt, holding the square firmly in position while you cut all the way through. Two small nails driven in on the center line will keep the square from slipping.

For cutting the other end of the belt, find the center line, the same as just described. Then at any point on this line other than where your belt clamps will come, take a point C as in illustration No. 5. Then using the square as illustrated, draw a line D C E at right angles to the axis, and all the way across from edge to edge. It is sometimes easier to draw this line by marking the points D and E and then placing a straightedge through the points D C E to draw the line. See illustration No. 6. Be sure your straightedge is straight, not warped. This line D C E will constitute a "base line" to measure from after the belt is in the clamps. Do not cut on this line.

You can determine exactly where you want to cut after the clamps have been put on and the belt brought into position. Then measure forward from the line D E an equal distance on each side of the belt to the cutting point. You can use calipers and measure over the belt clamp or run your ruler through the edges of the clamp. As a matter of convenience, always cut one end of the belt square and get it ready for making the joint before putting the belt into the clamp.

Remember that when you are doing a job, it is much easier to do it right than to do it over. This applies to making the completed joint as well as to cutting the belt. Therefore, it is best when joining a belt to do so in a way which is permanent and which insures the belt's most satisfactory service.

Personally, the writer, who has had considerable experience in working with belting manufacturers in solving the difficult problems of efficient belt

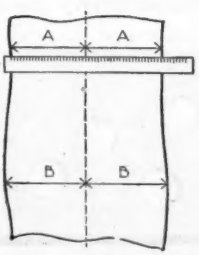


Fig. 4—Find the center by measuring in from the edges of the belt.

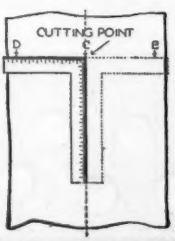


Fig. 5—Square by working from the center line and you'll not go wrong.

joining, is very much opposed to methods which punch holes in the belt or which in any way cut or weaken the lengthwise, power-carrying fibres of the belt.

Any thinking man can see that no belt can give better service than its method of joining will permit and if wasteful or destructive means are employed, the strength of the belt is lessened, its service impaired and its life shortened.

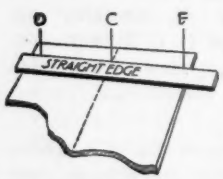


Fig. 6—On wide belts, use a straight edge when you haven't a large enough square.

It is no uncommon thing to see, in journeys through manufacturing plants, laced belts in which from 40 to frequently more than 70 per cent of the cross section of the belt is removed in punched holes. How in the name of common sense can such a belt joint be expected to give the full service of the belt? Many manufacturers are today running belts much heavier and more expensive than their requirements, in an attempt to get strength at the joint.

There are many types of metal fasteners in common use, which from an engineering standpoint are but slightly if any more satisfactory than lacing methods for several reasons. First, because many of them sever the lengthwise, power-carrying fibres. Second, because others place all the strain in a straight line comparatively close to the end of the belt. Third, because some make a joint which is so stiff and hard that they pound on the pulleys and cause the belt to break back of the joint. Fourth, because many put metal in contact with the pulleys, which causes noise and wears and crystallizes the metal, so that such joints must be constantly watched, both to prevent danger to workmen and failure of the joint.

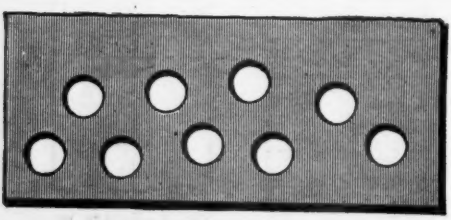


Fig. 7—Example of punching job as ordinarily done in the rush of work. Aggregate amount punched out is sometimes equal to 75 per cent of cross section.

The ideal belt joint is one which would run the same as endless without the drawbacks of difficulty in making and later shortening to take up stretch. Belting manufacturers themselves estimate that only a very small percentage of belts need to be made actually endless. Their estimates range from 0.5 per cent to 2 per cent as endless requirements.

It is possible to make belt joints which run the same as endless and which meet all requirements of this 98 to 99½ per cent of the belting field, without having any of the objections noted above.

Below is a table showing the qualifications of the perfect belt joint, by which any engineer can check up the comparative efficiency of his own methods.

1. Will maintain maximum strength of belt.
2. Will avoid destruction or weakening of the lengthwise, power-carrying belt fibres.
3. Should prevent breaking the belt back of the joint.
4. Must not hammer on the pulleys.
5. Must not be subject to wear or to crystallization.
6. Will insure continuous, uninterrupted operation without supervision.
7. Hugs the pulleys tightly and insures full transmission of power.
8. Runs silently, same as endless.
9. Can be easily taken apart for removing or shortening the belt.
10. Is safe against accidents or breakdowns.
11. Must be easily and quickly made without special equipment.
12. Will last for the life of the belt.

The Efficiency of Blasting

By A. S. DERINGER
Superintendent, Kelley Island Lime and Transport Co., Cleveland, Ohio.

IN order to get the greatest efficiency from one pound of explosive in rock blasting it is very necessary that a number of conditions be considered.

First, the kind of quarry operation: if hand operated or by shovel and track system. If hand operated, the degree of efficiency per pound of explosive should be much greater than under any other method, as the blasting can be done unimpaired; whereas if shooting for a shovel operated quarry where it is necessary to retain buffers to protect track and shovels, the degree of efficiency will be greatly lessened.

The nature of rock to be blasted is the second important item. The use to which the stone is put after being blasted also is a very important factor. If broken up by hand for lime kilns or other commercial purposes and no use made of spalls and other fines, the blaster will have to govern himself accordingly in order not to have too many rejections in the initial shooting.

If used for a modern crushing plant with a large capacity the blaster can be of great help to increase production.

Upon these various phases of quarry operation depend the kind of drilling, the spacing of the drill holes, and the depth below the working floor of the drill holes, although I would recommend this be from 6 to 12 inches, depending upon the thickness of the lower strata and if free or tight strata on working floor. In thin stratified limestone with an occasional heavy stratum, averaging from 6 to 24 inches, and a fairly free bottom, one pound of explosive should dislodge 6 tons of stone in a manner to make good digging for a steam shovel. This does not include the explosive that will be necessary for secondary shooting, as this depends more or less upon the kind of crushing equipment, if of the smaller type or of the large modern type that will take almost anything a shovel can load.

The distribution of the charge in the blast hole is a very important factor and one that can increase or lessen the efficiency of every pound of explosive used. If the explosive is placed in the hole promiscuously the same results cannot be expected as if due regard were given to the various stratifications and distribute the power throughout the entire burden.

In view of the various methods of operation and kind of rock to be blasted, there is no fixed rule to follow, as each operation will have its own peculiar situation that can only be met by its operator if he will give close attention to the various details. I have found this to be true, however, and it should hold good under most conditions unless it be in very solid rock, but where stone is well stratified, that a liberal charge of block blasting powder of the C. F. & F. F. grade used in connection with dynamite will give excellent results and will also be cheaper than a full charge of dynamite.

Houston & Liggett, Inc., Lewisburg, Tenn., who are large producers of lumber at Lewisburg and Columbia, Tenn., as well as at points in other southern states, having for years owned phosphate holdings in the South, have purchased an additional large tract of land containing phosphate deposits. Mr. C. C. Houston, general manager, is also vice-president of the recently incorporated Mid-West Chemical Company, Nashville, Tenn., which will handle phosphate rock in ground and other forms.

Institutional Management for Business

(The Third of a Series or Articles.)

"JOHN," said an employer to a gray-headed man, dressed in overalls, "tell this gentleman how long you have been working for me."

"Forty-two years the tenth of last May since I started to work for the boss. I only had one job before that time, and the boss and I have grown up in this business together and we have grown old together. We have been friends all these years and I don't want to work for anyone else. I was the first man he ever hired for this business, and now he has hundreds of people working for him. Many of them have been here so long that they are gray-haired like me."

John went on to tell why he and others had been faithful to this employer, and his story showed that just as faithful and steadfast as the employees had been, so had the employer been to them. It was an institution around which employer and employee had rallied. Each was interested in the success of the institution, each wanted the grade of goods produced to be of the best, each was proud of the company's good name, there was a mutual understanding and acquaintanceship that meant to all more than the dollars that each obtained from it.

Thus a new employee caught this spirit and either entered into it with zeal and a desire to become a part of the institution, or else the company was not congenial and he soon dropped out.

Contrast this with the spirit of another employer who operated in the south some years ago, his oft-repeated remark being, "Kill a negro, hire another; kill a mule, buy another." This man, even if he did not believe his own statement, gave everyone a bad impression of his methods, and it was a fact that his horses and mules were poorly cared for both by himself and his men.

It is from the effect and practices of such men that the world is suffering today. To right the wrongs we must know and understand the abuses of the past. It is true that all employers have not been unreasonable or thoughtless in the past, but with a large per cent following bad practices, labor has taken its cue from those who have suffered, so much so that they have become suspicious of nearly all employers. This is evidenced by an operator writing:

"On account of the fear of our men that we have something up our sleeve, we have never done anything in this line. We have hot soup for our men at our gravel plant at noon and hot coffee all day long, just as free as the drinking water; and one-third of the men will not accept it. Despite tact and everything else, they think we have an ulterior motive."

This operator writes knowingly. The writer has had exceptional opportunities in his life to know labor conditions from both the laborer's viewpoint and that of the employer. He has labored with his own hands, has fared with the laborer, lived with him, seen the abuses of many kinds put upon him, and he has been an employer, having under him at times several thousand men.

Men in quarries as well as in other classes of work have been employed for wages that hardly meant a living for themselves and family and then were defrauded of part or all of their pay. A protest meant they were beaten, or else threatened with pick handles or pistols, poor returns for work rendered. When fed by their employers the food often has been punk, so bad that few could eat it, with no

means of redress. Frequently the boarding privilege is let out to a third party, whose sole idea is to make money off the men.

Men are treated in the same way as to purchases in a commissary or company store. Indifferent goods are sold at exorbitant prices and the comfort and appearance of the men and their families seldom considered. Men have been compelled to live under unsanitary conditions and in shacks that were hardly fit for animals. These things are not soon forgotten, and unfortunately, although in some respects conditions have been bettered, yet there are some abuses that exist.

During the past year the writer has visited some quarries where the houses for the workmen were of the worst possible type. In one quarry, the bodies of some old box cars had been set on the ground and a few windows and doors put in them, but one glance into the interior of them was enough to drive any self-respecting workman to another job.

How are these things to be overcome? First, the employer must gain the confidence of his employees. This cannot be done easily, but it is possible to do it, by seeing that in each case the past abuses are stopped and that men cannot hold such things against the employer. The next step is to get the personal touch with employees, already written upon in these articles. The third step is a continuation of the second, for personal touch means to know one another, and if the employer has pride in his work, his plant, his lands and property, his organization, he will not permit on his property an unclean, poorly lighted and unventilated house, whether it is his fault or that of the workman.

The welfare of the workman and his family is the next step, but if this is gone about too hastily or in the manner of the reformer, the workman will resent it and trouble follows. It is a poor rule not to practice what one preaches.

To build up an institution to which men will be loyal, there must be a plan and organization worthy of its name. The operator must set an example for others to follow. If his office and plant are kept in disorder and his property has the appearance of being neglected, the men will follow in his footsteps.

These things, if properly handled, will help in there being confidence between the employer and the employee, for men will have confidence in those whom they respect. Confidence will follow pride and helpful acquaintanceship.

Confidence is not bred by a show of giving things to workmen. They will not be won over by sops seemingly thrown to them. Men must feel that they have earned what is given to them, or at least what is due them. Thus, feeding men gratis seldom takes with them, for in most cases workmen will say, "I would rather have them pay me the full wages I have earned, and let me buy what I want to eat, when and where it suits me. I don't like their soup and their coffee is poor. If they can afford to give these things away they can afford to pay us more money." To understand these things, an employer should try to put himself in the place of the other man and get his viewpoint.

If men have come some distance to work in a pit or quarry, an inexpensive yet comfortable shed or building can be built for their use. Here they can have lockers for their coats and other clothing, each man locking his up and carrying the key. A place can be fixed so they can wash. The building with seats on both the inside and outside will be used for eating lunches, a quiet smoke, for reading a paper or any social feature during the noon hour.

In summer time it will serve as a

cool spot, in winter stoves can furnish heat to make it comfortable. Here lunches can be kept so they are clean and kept from freezing in winter. If cook stoves are placed in it, the men will warm their coffee and other things in their lunches. In summer time ice water can be kept here. Bulletins can state that the simple comforts furnished by this building are for the benefit of the men, who are not placing themselves under obligations by using it.

With the men gathered at such a place at lunch hour it is an easy matter for someone representing the company to get acquainted with the men. Talks can be given to them, the men can be interviewed, papers, books, circulars and other things that may help can be used to serve coffee, soup, and other foods, not giving them to the men, but selling them at cost or less than cost if this is believed best. Thus for 5 cents a man could get a cup of coffee and a small bowl of soup or two cups of coffee. Gradually other things can be added and new merchandise can be sold at a fair profit, but never use the entire building for business; leave ample room at all times for the men. If changes are to be made in the building, consult the men about it and follow the majority as to their desires and wishes. Too many things are given to men only to be taken away from them, thus causing them to lose all confidence they may have gained in their employer.

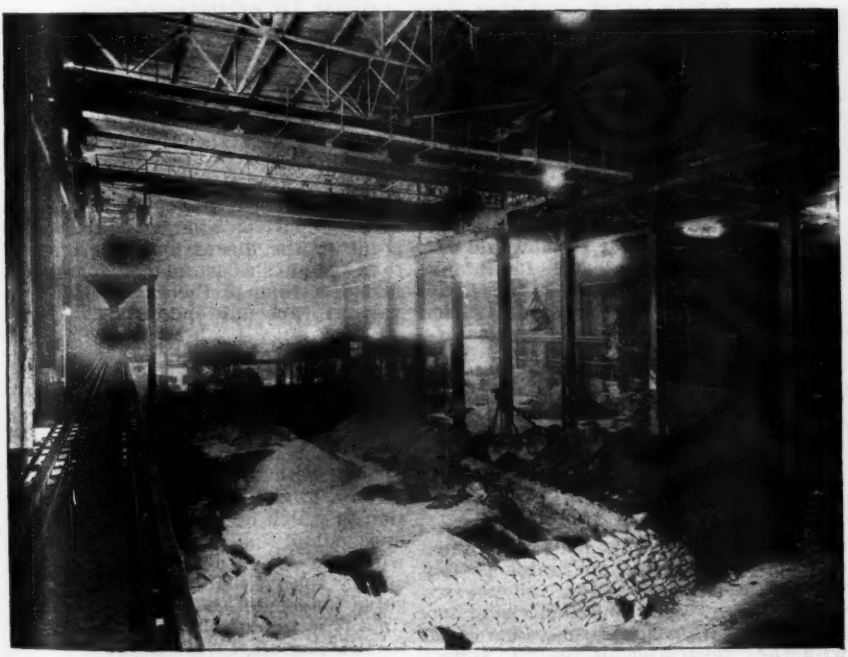
In starting all new things it is necessary to go slowly. There should be preliminary education of the men. The building referred to is ideal for this purpose. From it many things can be developed, but the men must be unconsciously led and educated if the desired results are to be obtained. The seeds of radicalism and all the other "isms" that men have absorbed until some workmen are about ready to turn the world upside down, is due to the teachings, the educational work and unconscious leadership of a few radicals in the different countries of the world. Why should not the employers of labor use the same methods to win men back to them?

This has been done. Last November a general strike was called in all the coal fields of the United States. For a year or more prior to this strike a coal company in the south had furnished their men a meeting place. They had talked to them of their own and the company's interests, how each were linked with the other, they had talked together on labor conditions, on Americanism, and the men had been furnished with good healthy reading. On November 1, when all the other miners around them went on strike, what was the action of the miners employed by this far-seeing company? These men went into the mines that day and increased their output almost 50 per cent over what it had averaged per day for a few weeks previous to the strike. Surely this was worth while and justified the educational work done among these men.

Some years ago the writer began such work among his men by simply putting up a small open shed, only a roof on four posts, with a sign on one post saying it was for the use of the men. Promptly someone tied a horse under it, but it was taken out and the place cleaned up. By slow steps this shed grew to be a center for the men. First benches were put in by the men themselves. Then came a demand for sides and windows, which were furnished. Finally the men and their wives used the reconstructed and enlarged building for dances and various kinds of socials. A small stove close to it did a good business on these occasions.

Time and thought must be given to these things and they must be worked out along the proper lines and they will pay handsome dividends.

The traveling crane is most efficient for handling ground limestone and other similar material.



Double installation of traveling cranes. Note how they deliver to hopper of track at side of building.

(Photo by courtesy of Material Handling Machinery Mfrs. Assn., New York)

Reply to Criticisms of Proposed Law

By ELMER O. FIPPIN
Secretary, National Lime Association, Washington, D. C.

The comments on our proposed uniform agricultural lime inspection law developed at a meeting of a group of manufacturers of agricultural limestone as reported in the October issue of PIT AND QUARRY, conveys several wrong impressions about the terms of the proposed law that we feel should be corrected at once.

First, let it be said that it had not been our thought to carry the provisions of this proposed law into the public press at this stage because it has not been sufficiently worked over in conference with manufacturers of liming materials and with the representatives of agricultural interests so that we are ready to say it is in the final form, for which we are ready to stand. Our policy has been to first submit it to manufacturers of all kinds of lime suitable for use on the soil, including limestone manufacturers as well as producers of the burnt product. It was in this way that the proposed form of the law was brought to the attention of the National Agricultural Limestone Association and led to the comments in hand. Now that it has gotten into the press we are, of course, concerned that correct impressions be gained by all those who are interested in this matter. We have aimed to bring about cooperation of all agencies interested in such laws so that any final form would at least represent the majority of opinion.

Some Essential Features of the Law

In considering the proposed law, it may be divided into several groups of provisions. In the first of these the various liming materials that are suitable for use on the soil are defined and along with this definition of materials is a statement and definition of terms suitable for application to the different liming materials. The second division deals with the form of the label which a manufacturer must use. The third group deals with the form of the required guarantee as to both chemical composition and physical character. The fourth division is concerned with certain exceptions and with the preparation of reports, state penalties, etc.

As to Definitions

The committee representing the limestone producers first criticise what they assume to be an attempt to summarize all carbonate forms of lime under one heading, while quick lime and hydrated lime are given separate and specific names. They have apparently overlooked the fact that they were dealing with that part of the proposed law which defines the *chemical form* of the various materials that may be used on the soil. If they will turn to page 6 of the form, they will find a statement of the various names under which all of these liming materials are commonly recognized by the public and here all commercial forms are listed exclusively under their common names without confusion with such chemical terms as carbonate of lime, which are listed under three heads, namely, pulverized limestone, marl, pulverized mussel shells or pulverized oyster shells. So far as I am informed, this includes all of the natural carbonate forms of lime that may be used. There are, of course, certain by-products, such as that from the acetone manufacturer which are carbonate in character, and these are provided for under the general heading of "By-product Limes," with their source name. Their exact chemical and physical nature will appear under the provisions of the report on analysis. At another point in the discussion it is credited that emphasis is placed on burnt forms of lime to the exclusion of the various carbonate materials.

No Discrimination

We submit that a careful examination of the law will not support this statement. Our endeavor has been to approach the whole subject of lime inspection from the unbiased point of view of both the manufacturer and the farmer, to give the latter that information to which he is entitled, and which most simply and most clearly deals with the constituents and properties of any liming material that affect its value for use on the soil. At the same time it is important to be equally fair to the manufacturer of all forms of liming material as to the form of the analysis required and the conditions under which inspection is to be carried out. If at any point we have de-

viated from this policy, then we are open to correction.

We have closely studied all of the thirteen state laws now in effect and have also had in mind the wide experience gained in fertilizer inspection laws. We have analyzed the essential features of those laws and have endeavored to prepare a form of law including those essentials in the simplest possible terms and in the least possible technical language.

Chemical Analysis

Question has been raised about the form in which the chemical analysis should be reported. The first and most vital consideration here is that all materials be reported on one basis in terms of the constituents which the farmer is concerned in buying. In commercial fertilizers the evolution has been in the direction of stating the percentage of an element present; for example the earlier practice of reporting phosphorus in terms of bone phosphate, we have evolved, first to the statement in terms of phosphoric acid and now we are beginning, in several states, to report only the percentage of actual phosphorus which is the one thing the farmer is concerned in purchasing. That is the primary constituent that gives its value.

Having this fact in mind, it should be recognized that the chemical analysis of liming materials may be uniformly stated on any one of four bases. First, in terms of the actual liming element, that is, calcium and magnesium. This has been adopted by the Ohio law in part. Second, the liming elements may be stated in terms of the oxides of calcium and magnesium. This is the form most commonly used in fertilizer reports and in part by most lime inspection laws, and was adopted in the initial draft of our proposed form because it was believed to most nearly represent the views of inspection officials at the present date. Third, the materials may all be reported in terms of carbonate of the liming elements, calcium and magnesium. On this basis. limestone and marl would never range to exceed 100 per cent down, while burnt forms of lime would have a carbonate equivalent of upwards of 179 per cent, depending upon their purity. Fourth, the materials may be reported in the terms of their calcium carbonate equivalent, which means that magnesium carbonate would be translated into its equivalent of calcium carbonate in acid neutralizing strength. This implies that the one factor of a liming material that gives it value is its capacity to neutralize acid. That plan has been adopted in the Ohio law and the law of some other states.

We believe in the light of the best investigations at several institutions, that there is serious question as to the accuracy of this claim. First, because the liming elements appear to perform several other important functions in improving soil fertility and crop growth which is independent of acid neutralization, and in these functions magnesium does not seem to play as important a part as calcium. In the second place, the range of chemical activity of two elements in the soil is not the same and there is much indication that the advantage is in favor of the calcium constituents, at least on a par with equal weights of magnesium.

While we have put into our proposed law the statement of liming materials in terms of the oxides of calcium and magnesium, our preference is for report in terms of the element itself, that is calcium and magnesium, as adopted in one part of the Ohio law. To our mind the first essential of fairness to the farmer is that all liming materials be reported on the same basis of analysis and whichever one of the first three above methods seems to have the largest support will have our approval, at least until we have evolved further in dealing with such matters, but to report one material on the oxide basis and another material on the carbonate basis or percentage purity, is too thoroughly misleading and confuses the farmer. Further, we believe that no informed man will contend that the carbonic acid in a liming material has value in the soil. It is pre-eminently the lime elements, calcium and magnesium, the farmer is interested in buying and when liming materials are presented to him on the carbonate basis, the information is camouflaged in exactly the same way that some manufacturers of commercial fertilizers formerly camouflaged their percentage of phosphorus by stating it in terms of bone phosphate, which made the proposition look at least twice as big as when presented in terms of phosphoric acid, and about four times as big as when reported

in terms of phosphorus, the real element with which he is concerned.

Mechanical Analysis

Taking up now the form of statement of fineness of liming material. The committee contends for the admission of screenings and the statement of analysis is in such a form to show the maximum size of screen through which all material will pass. On this point the reader should be reminded that there is at present a wide difference in opinion as to the fineness to which liming materials should be reduced to be reasonably effective within a rotation or two. In the middle west there has been quite a strong feeling in favor of very coarse material running up to screenings of a quarter of an inch sizes. In the east and south, experience and investigations are in favor of very much finer materials, and there is now a tendency, in the central states, to swing to finer materials. We believe that a careful examination of the best investigations at the different experiment stations show a preponderance of evidence in favor of finely pulverized material and indicating that coarse material is essentially dead weight and nearly inert in character within any reasonable period of five or ten years.

In drafting the proposed form of law we do not presume to stand as a judge between these different opinions. We call attention to the fact that a statement of the maximum screen through which a liming material will pass, especially if that screen be fairly coarse, such as a ten mesh, gives to the man who wants only fine material no information that will guide his selection. It seemed to us that the only fair method was to present to any farmer or other person examining the facts, an actual statement of the fineness of a material, showing the proportion of material of different sizes. The law, therefore, admits any carbonate material which includes limestone, which is as coarse as 3.6 mesh per inch, which certainly ought to include the great bulk of screenings. At the same time, 5 screens below that size have been picked out from the standard series developed by the United States Bureau of Standards, and now widely accepted throughout the country, and employed by practically all screen manufacturers.

In the original form of the proposed law, the sizes selected are one-twelfth, one-twenty-fifth, one-fiftieth, and one-one-hundredth of an inch in diameter, and the analysis would report the percentage of material which passes each coarser screen but does not pass the next finer screen. Such an analysis would enable any person to determine the amount of material in that sample of a fineness to which he would credit value. One man might include all of the materials. Another man might include only the materials passing the one-fiftieth and one-hundredth screens, but he would have essential information for his guidance which he does not have at present as a result of any state law now in effect. In other words, the purchaser is provided with the facts and is left at liberty to evaluate the various groups as he sees fit in the light of state experimental results. At the same time, such form of law would be an advantage to the manufacturer of screenings, especially to the one whose product has the larger amount of very fine material, because this fact would immediately appear in the analysis.

In some quarters it has been suggested that we should also include a two-hundredth inch screen which would show the extremely fine material. To this we are not unalterably opposed but having in mind that the finer screenings greatly increase the mechanical difficulty of carrying out the inspection law, we had been willing to omit a determination of this extremely fine material but as there is a general feeling in favor of its inclusion, we are ready to accept that change.

Co-operation Invited

We may add that the development of our proposed law is now in the stage of submission to agricultural officials for their opinions and we should hope that ultimately there might be some general conference of all these interests on the subject where any final differences might be worked out agreeably to the majority of opinion. The three big factors in this whole matter in our view are, (1) the development of a form of law to which all states having such provisions can subscribe. (2) Agreement as to the terms to be used in such laws. (3) The statement of analysis, both chemical and physical, of all forms of material on the same basis.

FERTILIZER IN "EGYPT"

It Induces One Writer to Burst Into Song, Among Other Things

Frank Ridgway, writing for the Chicago Sunday Tribune, chose to discuss recently the agricultural improvement of southern Illinois by reason of land fertilization.

Incidentally he introduces his story with some verses appropriate to the occasion by someone who signs himself "Silas," as follows:

I ben thinkin' 'bout our Egypt for quite a lengthy spell,
But I reckon if I'd talk a week I couldn't rightly tell
Of bumper crops I'm gettin' from what was worn out land,
For since I limed 'er up, b'gosh, things grow to beat the band.
At first I didn't take no stock in bildin' up the sile,
But a banker he persuaded me to give the thing a trile;
"Why, man," says he, "your land is sour—you ought to sweeten it;
Crushed limestone, phosphates, nitrogen —just try 'em out a bit."
So, by heck, I went an' done it—I jist limed her up f'r fair,
An', b'lieve me, crops have doubled! Old Nature's done her share,
Caro is in Egypt, an' both's in Illinois,
An' mark my word—Old Egypt is goin' to make a noise,
F'r Egypt is a section that's been misunderstood,
Some's got the idee that our land ain't any good—
That Egypt won't grow nothin' much 'cept chills and ager-akes,
An' woodticks an' miskeeters—which of course is all mistakes.
Why the truth is jist the opposite, f'r the richness of the sile
Will rival fields and pastures in the valley of the Nile.
And scenery! Broad prairies roll like ocean waves afar,
While lake and stream where waters gleam, reflect each trembling star.
Our Ozarks, too, have beauty spots with woodsy nook an' glen—
They offer change, and rest, and peace to all the sons of men.
I tell you, folks, Ma an' me have sure renewed our youth;
We're boosters for this Egypt land, an' that's the sollum truth;
It'll serve mankind with bounteous hand, an' all its riches give,
An' millions will yet bless the day that they come here to live.

Following this Mr. Ridgway says:

"Only a few years ago tourists used to stop on the west end of Eads bridge at St. Louis, after crossing the 'Libyan Desert' of Egypt, the southern end of Illinois, and tell how lazy, indolent and old fashioned the farmers were in that section. It is a different story today, for the average 'Egyptian' farmer is alert, ambitious and progressive in his methods of farming, and they are all becoming boosters for their 'empire.'

"For years the farmers in southern Illinois have been told that no good things could come from Egypt, and many of them believed it themselves. Much of the poor land was branded hopeless. Not all of the people who live in that section believed this and as a result there has been a 'pull together' movement launched to make a survey of conditions, resources and possibilities, so the people can boost for their community and tell outsiders what they have in the 'Egyptian empire.'

"Farmers, bankers and merchants have recently formed an organization which will work with the farm bureaus to improve agriculture in Egypt. An attempt will be made to develop the natural resources and improve the economic, social, religious and educational conditions in the thirty-two counties that are enlisted in this work."

BIG CHEMICAL MERGER

Five Well-Known Companies Combine With Capital Running Into Nine Figures

Plans to merge five of the largest chemical companies in the country, whose capital at present, if combined, exceeds $175,000,000, were announced recently in New York by Dr. William H. Nichols, chairman of the board of the General Chemical Company. Those to be merged are General Chemical, Barrett Company, National Analine and Chemical, the Solvay Process Company, and the Semet-Solvay Company.

The contract for the construction of the new plant of the Berkshire Stone Products Company, South Egremont, Mass., has been awarded to the J. R. Hampson Company of Springfield, Mass. The work includes the construction of 2½ miles of new railroad and the erection of several buildings, all of which will bring the cost up to approximately $100,000.

Unusual Developments

Some Lessons Drawn From the Situation in New York

SIGNIFICANT developments are transpiring in the national building industry to which importance is attached by the Dow Service Daily Building Reports, New York.

In a telephone canvass of leading manufacturers of all of the basic building materials entering into construction of homes and commercial structures these conditions were reported:

Buyers who have been prone to cancel orders are either accepting deliveries or are now merely requesting that shipments be held until after the first of the year.

More money has been pledged or already invested in new construction work for the first nine months of 1920 than was pledged during the same period in 1919. For 113 cities $1,170,000,000 was invested in new building enterprises as against only $871,000,000 during the same nine months of 1919. The difference is, however, that $1,170,000,000 this year provided for 325,000,000 square feet at $3.60 a square foot as against 272,000,000 square feet on the smaller investment of $871,000,000 when the average cost was $3.20 a square foot.

Competent authorities in various departments of building material manufacture declared that nothing like that amount of construction work has been completed. Much of it represents material still to be delivered. Furthermore, available stocks on hand or likely to be produced between now and the first of the building season of 1921 will allow little or any margin for late comers into the building market.

Cement offers as good a barometer as any commodity because it enters into probably the greatest variety of structures, including railroad work, which will be still another factor of drain upon material supply.

In the cement manufacturing districts supplying the New York market, the present rate of shipment, and estimating November and December shipments, mills in Zones 1 and 2 will have shipped in 1920 over 31,000,000 barrels. With good transportation facilities such as manufacturers are now experiencing and absence of arbitrary orders from the Interstate Commerce Commission and better labor conditions, the same eastern mills should be able, in the absence of the evils above referred to, to ship in 1921 several million barrels more than in 1920. Manufacturers go into the new year with less contract obligations for delivery of cement through 1921 whereas in 1920 they had heavy obligations for future shipments.

However, the cement ground during the month of October, 1920, in Zones 1 and 2 exceeded by 6 per cent that of October, 1919, and amounted to 3,200,000 barrels. The shipments were nearly three and a half million barrels, but because of lack of cars amounted to only 97 per cent of what they were a year ago. October production was the greatest ever recorded.

The cement on hand had dwindled as of Nov. 1, 1920, to almost negligible proportions, the total being 750,000 barrels or only 33 per cent of what was on hand in October, 1919. Leaving outside of the calculation the two largest companies in the industry, those two companies having only 175,000 barrels each on hand, the average for eight manufacturers was only 22,500 barrels in the warehouse, which does not represent very much more than the dust on the beams. Stockhouses are thus practically empty. Never has such a condition obtained before.

Lumber manufacturers have issued

to the trade their minimum price lists, and sufficient time has elapsed to indicate that they are really minimum. Heavy tests have been applied, but none has budged from the rock bottom set. Dealers are still piled high.

Building money is going to be easier. The architects have been making a first hand study of the situation and they are advising their clients that delay is dangerous if they need their projected structures. Brick is cheaper in New York than in any place in the East, and already is moving up. The entire building situation is gaining strength and the sooner the manufacturer can gauge the market's requirements and the dealer can operate at his normally efficient speed, the quicker construction costs will strike a fixed level. The market is plainly edging toward that stage now.

Southern and western business men have organized a company at Emporia, Va., for the manufacture of potassium phosphate from North Carolina feldspar and Tennessee phosphate rock. This is combined with a soda flux for reducing the melting temperature. The fused product is said to contain 16 per cent phosphoric acid and 6 per cent potash. A deposit of feldspar in Warren county, N. C., and 150 acres of phosphate lands in Tennessee have been held under option, and a plant secured at Emporia, Va. A. L. Kreiss, a California engineer and chemist, who was instrumental in establishing the potash industry in Nebraska during the war, is the inventor of the process, and the president of the new company. Other officers are R. F. Graves, vice-president, of Raleigh, N. C. and South Hill, Va.; A. F. Dodd, Emporia, Va., secretary; and G. L. Vincent, treasurer, of Emporia. The company expects to begin business with a quarter million dollars.

The Keystone Sand & Supply Company, Pittsburgh, Pa., is expecting to have in operation as soon as they can be completed, four all-steel sand barges, which the Dravo Contracting Company, Pittsburgh, will build for them.

Stripping by Blasting

This Method Used in a Sand Pit by a Maryland Producer

IT has been common practice for years to use dynamite for stripping top soil from iron ore beds, shallow coal deposits, stone quarries, etc., but it is unusual to blast the top soil from sand and gravel pits; yet the method is just as applicable to such work and saves as much time and labor in the one as the others.

A description of the method employed by the Washington Sand and Gravel Company at their works near Bladenburg, Md., may be of interest to other producers of these materials.

Their pits are located at the side of a creek or small river. The sand is loaded on boats by means of a floating suction dredge operated on the creek.

To get at the sand, it is necessary to strip off 4 to 6 feet of top. This stripping is now done by blasting with dynamite. A shot recently observed by the writer was loaded as follows:

Bore holes were put down vertically 4 feet deep and located 8 feet back from the creek bank. In this shot, there were seven charged holes, 2½ feet apart in the row.

Five cartridges of 40 per cent ammonia dynamite, 1⅛x8, was the charge in each hole. Each charge was primed with an electric blasting cap and the firing done with a blasting machine.

The shot removed the top from the section blasted, throwing most of the dirt into the creek.

It is figured that the cost of the blasting is more than balanced by the saving in the time and cost of operating the dredge to remove the top. This work was all waste, because no use could be made of the top soil.

One-Third Production in Indiana

Association Offices Will Move to Washington About December 1

By Our Indianapolis Correspondent

ONLY about 33⅓ per cent production during the entire season in Indiana has been shown in the industry, according to estimates of E. Guy Sutton, secretary of the Indiana Sand and Gravel Producers' Association.

The low percentage of production has been caused entirely by lack of cars, he said.

Reports from all parts of the state would seem to indicate that the demand for sand, gravel and crushed stone for road work especially is more active than ever before, but yet with other industries reporting an improved car service and with executives of these industries gradually getting on speaking terms again with railroad officials, the sand and gravel industry appears to be just about where it was in the middle of the summer so far as cars are concerned. At the present time the coal trade is gobbling up about all the open top cars in the state.

Plans now are being made for the removal of the offices of the National Association of Sand and Gravel Producers to Washington, D. C. This action was taken at the last meeting of the executive board in Chicago, according to E. Guy Sutton, business manager of the national association, and Mr. Sutton is in Washington at the present time making arrangements for leasing offices and it is the present plan to be located in the new place by December 1. Mr. Sutton, who is secretary of the Indiana association, will relinquish that position when he moves to Washington and it is more than likely that R. C. Yeoman, at present extension agent for the state association, will be appointed to take the place made vacant. According to officials of the national association, all mail should continue to be addressed to the Indianapolis office until official announcement is made of the change in address.

Announcement was made here recently of the formation of what is to be known as the Kokomo Sand and Gravel Company, a company organized for the purpose of wholesale and retail sales of sand and gravel. Articles of incorporation have been filed here with the secretary of state. The company is capitalized at $10,000 with the following directors: Walter J. Dixon, John W. Harbaugh and Jacob F. Bergman.

Articles of incorporation have been filed here by the Midway Products Company, a newly organized concern formed for the purpose of producing sand and gravel. The company is located in Jeffersonville township, Clarke county, Ind., and is capitalized at $10,000. The directors are Henry W. Beecher, Claude V. Allhands and John Gienger.

Gravel and cement dealers of Indiana have been asked by the Marion county commissioners to send representatives soon to meet with the commissioners and discuss proposed changes in specifications for the construction of Marion county roads. During the past year there has been considerable complaint against some of the specifications. It is said that waste of sand in present supplies of gravel necessitates modifying the present proportion of cement used in building roads.

The trade should be benefitted materially by the inclusion of more roads in the state highway system and a highway improvement for 1921 that is greater than that of 1920, when the

demand for all grades of sand and gravel far exceeded the available car supply. The trade here is of the opinion that it will be possible to supply all the demand for any road improvement program provided the railroads make possible a better car supply. The new program calls for the improvement of approximately 120 miles of roads more than had been expected when the entire ten year program was evolved.

Following reports that the International Cut Stone Contractors' Association, with headquarters here, was under fire at a recent hearing of the joint legislative committee in New York City investigating the "building trust," A. J. Burrage, secretary of the association, refused to make any comment. Mr. Burrage said he knew Henry Hanlein, a large contractor in cut stone in New York, and who was mentioned in the dispatches. Mr. Hanlein he said was a member of the association, although not a member of the legislative committee.

The Indianapolis board of public works recently issued an order to the Capitol City Gravel Company to cease removing sand and gravel from White river near Oliver avenue within the next week because, the board said, removal of sand and gravel at this point is endangering the abutments of the Oliver avenue bridge across the river. The board several months ago ordered the company to stop taking sand and gravel from the river at this point and gave six months in which to comply with the order. Members of the board said the time limit had expired and the company had not yet ceased its operations.

Another of a long list of gravel pit accidents to be reported this year occurred recently when an employe of Ira Creider, operating a pit about ten miles southeast of Logansport, was killed in a cave-in. The man, wagon and team were buried under about 100 tons of gravel and it required twenty-five men two hours to extricate the body. It is thought that recent rains had so worn away the walls of the pit as to cause the accident.

Fire, believed to have started from the kitchen range of a gravel digger, burned the boat belonging to the Fisher Towboat and Barge Line to the water's edge recently near Mt. Vernon, Ind. The company, in addition to operating a barge line, handles washed sand and gravel. Several other boats in the fleet were threatened at the same time. With the boat was destroyed an 8-inch belt-driven centrifugal pump, a 50-horse power steam engine. The boat with its equipment was valued at more than $15,000.

Practically all road work in Blackford county is tied up at the present time because of a shortage of stone, according to the county road superintendent. Three of the largest jobs in the county were to have been completed this fall; but because of the continued shortage, work on them has not begun.

"Pep" Meeting in Iowa

Sand and Gravel Men Will Have One This Month

THE secretary of the Iowa Sand and Gravel Producers Association, Gaylord E. Gray, writes as follows: "No definite date has been set for the meeting of the Iowa Sand & Gravel Producers Association.

"It is expected, however, that a special Pep Meeting will be called for December 15th or 16th, at which time the business manager and the president of the National Association will speak.

"Since this meeting comes so late it is probable that the annual meeting will be held sometime immediately after the return of the Iowa representatives from the National convention, which is to be held in January."

Slider Has New Office Building

Plenty of Work Promised for Spring in Louisville District

By Our Louisville Correspondent.

AS this is being written the Louisville sand and gravel people are practically winding up their operations on the river and fixing to go into winter quarters with their equipment. The season as a whole has been a good one, considering that building operations have not been of as large volume as was expected. The demand for sand and gravel started in early this year and February was a good month. With this early start they kept busy until mid-summer, making the first half of the year the better one. Then came some restrictions in cars and some slowing down in building operations, but there was enough business to keep jogging until November, when it slumped off considerably. There is still a little local business and a little shipping business but not much indication that there will be a heavy demand for sand and gravel during the winter months. The local operators, however, are well stocked in their yards and prepared to take care of any winter demand which may be forthcoming.

The Ohio River Sand Co. still has some unfilled contracts and is doing some carload business as well as local business and has a pretty good stock piled up in the yards to supply the winter needs.

The E. T. Slider Co., with yards in Louisville and New Albany, report that business has slowed down considerably during November and they expect it to go slow during the winter. Industrial building and road work has helped out considerably and promises to start the next season off in good shape.

The E. T. Slider Co. have erected a new two-story office building at the Louisville yards and are nicely established in it and have reset their scales and put things in shape generally. They make a feature of coal during the winter and this helps keep their delivery rigs going and their organization together.

R. B. Tyler says that cars are still scarce, especially on the Southern Railway. He is even finding some trouble in getting cars to ship sand and gravel. His quarry here is still shut down, but he is operating at Buffalo, Ky., where he has some road contracts. Lately he has taken on some additional contracts for asphalt surfacing of roads, but he says there is not much prospect of starting up his quarry near Louisville until spring.

The best sign of the times in this territority is the promise of continued industrial building and the prospects for extensive road work next spring. Quite a lot of structural work this year has been for industrial buildings, and new industrial projects are being fostered at a rate which indicates busy times ahead in industrial construction. This even gives promise of a fair volume of business during the winter months, and indicates that the spring building will start early and be of goodly volume.

There is some talk of a special session of the legislature to levy a tax on coal and oil and create a special fund for a larger program of good roads work next year. There is a plainly evident sentiment through the state in favor of extensive road building and the outcome is largely a matter of providing the funds and getting contracts let for the work at what is considered a reasonable cost. The easing in the cost of living and the labor situation generally makes the

outlook favorable and lends encouragement to the idea that plans will be completed during the winter for a busy year in road building and that there will also be developed enough other structural plans to make the coming year a good one for the sand and gravel people and for the quarry folks.

The plant and elevator of the Nugent Sand Co., at the foot of Clay Street, Louisville, was damaged by fire November 17. The fire was in the elevator building and did damage of about ten thousand dollars to the building and hoisting machinery.

The office at Hoke's quarry on the Bardstown road near Louisville was wrecked by an explosion early in the morning of November 17. This quarry was formerly owned by McClure Hoke who recently sold it to Charles Stabler and Theodore Atkinson. It seems that most of the records and accounts kept in the office building were destroyed and an actual damage loss to property was about a thousand dollars. The explosion was either accompanied by or preceeded by fire and is something of a mystery.

Lime at Expositions

Will Have Prominent Place at Own Your Home Shows

Lime mortars will have a prominent place at the Own Your Home Expositions in Chicago and New York this winter.

Large centrally located spaces have been engaged by the National Lime Association in each hall, where the merits of lime in stucco, plaster, concrete, and masonry mortars will be graphically depicted.

Its value in waterproofing will also be shown, experimentally, as well as its soil-sweetening effect on garden produce.

Gypsum Field Reviewed

New Government Bulletin Tells All About It

THE Department of the Interior and the United States Geological Survey, have just published a new Bulletin entitled "Gypsum Deposits in the United States."

It is a very interesting and instructive Bulletin, and it will repay anyone connected with the Gypsum industry to send for it.

Gypsum has been quarried and used in the United States for more than a century; but it was not until 1895 that it became one of our important industries. Since that time, its use as a building material has increased from 265,000 tons, valued at $750,000, to 2,057,000 tons in 1918, valued at approximately $11,000,000.

The use of gypsum as a building material is by no means new nor does the credit for its discovery belong to us. It was used by the ancient Assyrians for sculpture, and the Egyptians used it as plaster in building the pyramids, some of which is still hard and durable, after four thousand years.

Gypsum is found in this country in 19 states, and in Alaska. New York state being the largest producer.

Its more important uses are as retarder for Portland cement; as land plaster or fertilizer; as filler for cotton, and the better grades of paper, and as wall plaster.

It is hard, durable and fireproof, and a poor conductor of heat, cold and sound, and for this reason its use as a wall plaster, and, more recently, in wall or plaster board has increased tremendously, and fortells a big future for the gypsum industry.

The East Tennessee Limestone Products Company, Bristol, Va., has been formed with a capital of $50,000 to operate limestone properties in this district. W. T. Swoyer is president.

Better Rate on Bonds

California Has Increased to 6 Per Cent for More Active Flotation

By Our San Francisco Correspondent.

ALL classes of construction, especially highway work, have been held up recently by heavy rains and storms throughout Northern California. Although building operations are somewhat limited at present, the rock and gravel industry is making preparations to furnish supplies next spring for the greatest building boom ever known in that part of the country. An optimistic feeling prevails.

Of the first importance to the industry in California is the result of the passage at the recent election of the amendment to the state constitution authorizing an increased rate of interest on highway bonds to a maximum of 6 per cent. This measure was put before the voters because of the past inability to float road building bonds at the legal rate of interest, 4½ per cent. Under the law, bonds of that nature could not be discounted. The result of the election on the road bond amendment will pave the way for highway construction on a large scale. If the amendment had failed to carry little or no highway construction would have taken place for some time.

Manufacturing establishments of concrete products, particularly concrete pipe are flourishing in California, and with the development of that business, small plants are being opened.

The Coast Rock and Gravel Co. has sent several carloads of material to the state highway in Nevada and to Reno for city paving. It is unusual for a California concern to get business in an adjoining state. E. J. Goodpastor, general manager of the firm, arranged the deal. Mr. Goodpastor is a staunch friend of PIT AND QUARRY. He says that no firm in the sand, rock or gravel industry can afford to be without the current number of that publication.

Construction has started on the five-story terminal warehouse building to be built for the Southern Pacific Railroad Co., by the Dinwiddie Construction Co. It will occupy the block bounded by Berry, Channel, Third and Fourth streets, covering an area of 825 by 100 feet.

A 21-story Class A office building will be erected by the Standard Oil Co. at Bush and Sansome streets, with construction in charge of the Lindgren Co. The latter firm will also erect a 15-story Class A office building at Main and Market streets for the Matson Navigation Co., at an estimated cost of $1,500,000.

At a cost of about $3,500, timber, sand and gravel bunkers will be constructed by the United Coal Sales Co. at 2900 West Florida street, Seattle, Wash.

Permission to issue 100,000 shares of its capital stock, par value $1 in exchange for its property near Vallecitos, Calaveras county, has been granted the Eagle Marble and Lime Co., a California corporation. Quarry marble deposits will be worked when crushers and sawing equipment is installed to produce commercial slab marble and crushed fertilizer products.

Suits for permanent injunction against a number of gravel removing firms are planned by the Alameda county board of supervisors as the result of a report from County Engineer Perry Haviland that the removal of gravel was lowering the bed of Alameda creek to such an extent that county bridges were being undermined. The board of supervisors has already secured an injunction prohibiting the Niles Sand and Gravel Co. from removing gravel from within 100 feet of the Niles bridge. The following firms are to be enjoined: The California Building Materials Co., the Coast Rock and Gravel Co., the Black and White Co. and Green and Brown Co.

Waste Rock Is Valuable

Greenstone Now Converted Into a Roofing Material — A Mother Lode Stone

The following dispatch has appeared in California papers, coming from Sonora, in that state:

Greenstone, a heretofore useless material, most generally found throughout the Mother Lode counties, has at last been put to good use and is now being mined in large quantities. For over 70 years miners have dumped greenstone into the waste pile, cursing their luck for having so much of it to handle.

It remained for the Certainteed Roofing Co., of Richmond, to find a use for this waste material. After an extensive period of experimenting, many uses have been developed for the greenstone, the chief being for roofing.

A plant has been erected near Angels Camp where crushers and screeners have been installed. The rock is crushed to the size of grains of rice and is thoroughly cleaned before being shipped to the Richmond plant. When applied to the roofing and flexible shingles, the greenstone gives them a permanent color.

C. A. Lillie, who erected the local crusher, leaves very shortly for Livermore, where the company is to erect a plant to use whitestone, to make white roofing. A plant is in operation in northern California, where a redstone is mined for red roofing. Lillie stated that the Certainteed people shipped all the stone used in their roofing plant from the New England states until their attention was called to the enormous supply in California.

A by-product is produced at the crusher plant, the dust being used for fertilizer, containing much lime. The company plans to make tiling and brick from this dust.

Besides the crusher plant, a large compressor and gallows frame will be installed for working the greenstone deposit. A large body of the rock has been opened up in an old 200-foot shaft on the property. As soon as the mining equipment is installed the plant will be operated on the three-shift schedule.

Unloading Contest

The Godfrey Conveyor Co. of Elkhart, Ind., is conducting an interesting contest among users of their conveyors. They offer cash prizes to the six men who can unload a car of coal in the shortest time, with the Godfrey Conveyor.

This is interesting, because it will arouse competition among the men, and spur them on to greater endeavor.

It would be a good idea for individual firms to offer a monthly bonus along this line.

Articles of incorporation have been granted to the Clem Gravel Company, Dallas, Tex. Mr. Clem has been in the sand and gravel business for ten years past under the name A. W. Clem. The paid up capital is $300,000. A. W. Clem is president of the new company, while J. G. Strawn is secretary and treasurer. The company owns a number of pits, all in the Lone Star state, one at Trinity Mills on the M. K. & T. R. R.; at Clem Spur, on the S. L. & S. F. near Carrollton; also at Anthony, near Denison, all of which are in active operation, though, owing to the all-prevailing car shortage, the combined production of their various plants is now reduced from 125 cars per day to 25 per cent of that amount. The latest and most up-to-date machinery is employed at all their works. J. G. Strawn was recently elected president of the Texas State Sand and Gravel Producers' Association, when this association was brought into existence.

The discovery of extensive beds of phosphate in Palestine and plans under way to develop them for local use will help to relieve the heretofore pressing shortage of phosphate in that country, whereby will be obviated the necessity for importation of large quantities of this material, as per the official publication of the British Palestine committee. Before the war several attempts were made by English, Italian and Turkish companies to work the fields, but owing to transportation difficulties they were abandoned.

National Lime & Stone Company, Carey, O., has decided to increase its capitalization from $200,000 to $450,000.

Eastern Trade Review

Conditions in Many Parts of Atlantic States

By Our Eastern Correspondent.

THE sand, gravel and crushed stone markets at New York remains featureless, and the slow trend of affairs is reflected on production and sales in the other important districts in this vicinity, including Long Island and points in New Jersey. Reports from the New England centers show a like condition, and all in all, the situation, while hopeful in aspect, is not one of immediate encouragement.

Dealers interviewed maintain that high prices of building materials are the cause of the great recession in the construction industries, and with the prominence of the sand, gravel and stone business in this line, the "back kick" is naturally being felt with extreme vigor. Road building is on the decline, as to be expected with the approach of the winter season, and lessened call for materials exists in this quarter. Stocks on hand in the New York district are sufficient for all immediate requirements, and with curtailment of production at the different plants during the cold weather, recent weeks have been given over to the development of necessary reserves.

A bright spot in the situation is the action of the Interstate Commerce Commission in annulling its recent order restricting the free use of certain cars, as referred to in the last issue of PIT AND QUARRY, making available additional equipment for the transportation of sand and gravel commodities, as well as other building commodities. The new ruling, effective, November 16, grants permission to the railroads throughout the country to use flat-bottom gondolas for purposes other than hauling coal. The action is possible on account of another order of like date, removing the coal car priority orders for territory west of the Mississippi River.

Despite reduced call for materials, sand, gravel and affiliated products are holding their own in the matter of prices, and quotations remain firm. There has been no change whatever in this respect during the past month, both producers and dealers maintaining the now well-established levels. Gravel is selling for $3.00 per cubic yard in carload lots, wholesale, both for ¾-inch and 1½-inch sizes; delivered prices hold at $4.25 at New York and immediate vicinity. The current quotation on sand remains at $1.50 per cubic yard wholesale, and $2.75 "on the job" from the dealers. Crushed stone of ¾-inch size is being turned by the producers at $2.15 per cubic yard in cargo lots, while dealers are quoting $4.00 for the material delivered; 1½ inch material is selling at $1.90 and $2.00 per cubic yard wholesale. Cement holds firm at $5.10 per barrel at the supply dealers, with $1.00 rebate for bags. Common lime in the standard 300 pound barrel used in this district is quoted at $5.20 per barrel, while hydrate finishing lime in cloth bags is retailing at $33.85 per ton.

Building stone has undergone a few price changes. Kentucky limestone is quoted at $2.05 to $2.10 per cubic foot; Indiana limestone, $1.80 to $1.85. Sandstone of good grade is available at $2.10 per cubic foot, while Gray Canyon material is selling for $1.75. Marble ranges from $2.25 to $3.00 per cubic foot.

The Evergreen Slate Company, Whitehall, N. Y., has filed notice of increase in capital from $6,000 to $30,000 for proposed expansion.

The Alsen Cement Company, Alsen, N. Y., is constructing a number of additions to its plant and making im-

provements in existing structures to cost about $500,000. The work will include extensions to the company's dock, erection of a new stock house, installation of new machinery at the mill, construction of a new conveyor system, and other work.

The O'Brien Brothers Slate Company, Granville, N. Y., has been formed with a capital of $50,000, to operate properties in this district. The company is headed by J. F., J., and J. E. O'Brien.

Olin H. Landreth, chief engineer of the Eastern Potash Corporation, New York, has resigned, to engage as a consulting engineer with office at 156 Fifth Avenue. He will continue with the Eastern Potash company in a consulting capacity; this company has construction well under way on a new plant in the vicinity of Metuchen, N. J., in the Raritan River section, for the manufacture of potash products, lime and a number of important by-products.

The Allied Trap Rock Company, Beckley, Conn., has plans under way for the construction of a new trestle and railroad siding at its properties. The trestle will be of reinforced concrete and will be constructed over the river and highway adjacent to the plant.

The Woodbridge Trap Rock Company, New Haven, Conn., has filed notice of increase in its capital from $1,000,000 to $2,000,000 for proposed expansion.

The Newell Quarries, Lee, Mass., have completed plans for the erection of a new one-story building to cost about $5,000. It will be equipped for granite cutting operations.

The Suffield Berlin Trap Rock Company, Hartford, Conn., has recently filed an involuntary petition in bankruptcy. Liabilities or assets have not been stated. J. H. Grozier, Hartford, has been appointed receiver.

The State Department of Conservation and Development, Trenton, has completed the compilation of figures covering the sand and gravel output of the state in 1919. It is set forth that the sand production totaled 2,794,637 short tons, valued at $2,013,222, as compared with a production of 2,699,116 short tons in the previous year, with valuation of $1,969,144. The gravel output in the 1919 period was 915,599 short tons, valued at $563,050, as compared with the previous year's production of 880,746 short tons, with valuation of $493,720.

Royle & Brock, Inc., Trenton, N. J., has received a contract for Indiana limestone to be used for the front of the new Niedt-Ertel building on South Broad Street, construction of which has been commenced.

The property of the West Jersey Sand & Supply Corporation, Westville, N. J., will be sold under the direction of Wolf, Block & Schorr, Land Title Building, Philadelphia, Pa., attorneys for the company. The site comprises about 37½ acres devoted to plant, with extensive other available acreage now used for farming purposes. The installation consists of a complete sand-washing plant, with power station, steam shovel, industrial locomotive, conveying equipment and other apparatus.

The American Lime & Stone Company, Bellefonte, Pa., has completed plans for the erection of a one-story plant addition, 36x230 feet, to be used for raw stone service. The structure will be of steel and reinforced concrete. A. G. Morris is president.

The Thomasville Lime & Stone Company, Thomasville, Pa., is completing a number of bungalows, as an initial housing development for employes at the plant. The homes will be rented to the operatives, and it is said at a rental of about $9.00 a month.

The Pennsylvania Reconstructed Stone Company, Williamsport, Pa.,

has been formed with a capital of $15,000 to engage in the stone business in this section. K. A. Walsh is treasurer of the company.

The Lake Shore Sand & Gravel Company, Erie, Pa., has been organized with a capital of $45,000, to operate a sand, gravel and crushed stone business in this vicinity. William A. Middleton has been elected treasurer.

William A. Wafer, Philadelphia, Pa., will make alterations and improvements at his marble yard at Mt. Vernon and Ridge Avenues, to cost about $3,000.

The Cambria Steel Company is curtailing operations at its limestone properties at Naginey, Pa., and it is said that the reduction in production will aggregate over 35 per cent at the present time. The total output is used by the company at its furnaces at Johnstown, and the reduction in operations at the steel works is responsible for the curtailment.

New Edition of Hendricks' Commercial Register

Like an old friend in a new dress the new 1921 edition of Hendricks' Commercial Register came to us this year in a bright attractive shade of red with black lettering and at once drew our attention. A study of the book revealed that the publishers had maintained the high standard of this book for the past 29 years, have retained all of its good features, and have added some new ones. One of the striking features of the book is its simple method of arrangement and complete index, making it the most easily used book of its kind we have seen, a feature which should appeal at once to the busy man. This ease of use is further increased by the exterior index, a feature added last year and continued in the new edition. An examination of the lists relating to the industries in which we are particularly interested showed them to be complete, accurate and up-to-date.

The book contains many advertisements which in no way obscure the lists, but in fact give the user much additional and valuable information.

The publishers have added a page of directions entitled "How To Find Information," which gives in concise form detailed instructions as to the best way to find desired information. From this we note that the book is divided into five sections, the "Index to Trades," "Classified Trades," "Trade Names," "Alphabetical," and "Advertisers Index." The purpose and use of each is fully explained.

Another addition this year is a sheet of perforated post cards on which users of the book are urged to report faulty listings, wrong classifications and concerns which may have been omitted. They say "Although every effort is made to thoroughly revise "Hendricks' Commercial Register" every year it is inevitable in a work of this size that errors or omissions creep in. The publishers will appreciate information as to new firms which should be listed, or ones which should be eliminated, changes of address, etc."

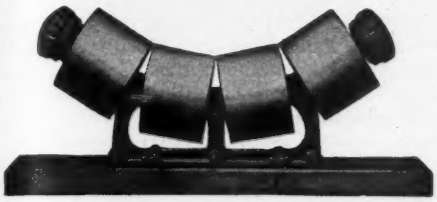
On the whole the new volume seems to us most complete and we believe the use of such a book almost indespensible in any well organized purchasing or sales department.

In the great reorganization of business following the war so many changes have taken place and are still going on that only by means of such a book, can a business house have readily available all concerns which now manufacture any article it may require or which are possible users of its product. Our experience has shown that many former sources of supply are no longer available while many new ones have arisen, and the same is true of outlets for the completed product.

To our readers who have used such a book in the past we recommend the new edition of "Hendricks' Commercial Register" and to those who have not heretofore used one we believe the purchase of this book will prove a profitable investment. The price is $12.50.

A British Columbia firm has under way a good development of the cement export trade. Recently a liner left Victoria, B. C., containing 40,000 bags of cement for the Orient. This shipment was the fourth large consignment made by this same firm during the last few months.

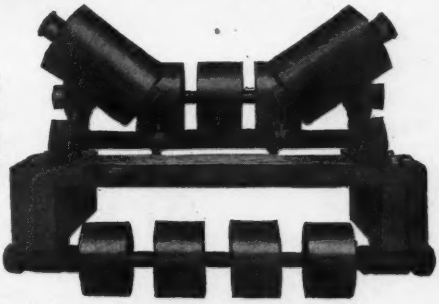
CALDWELL CONVEYORS

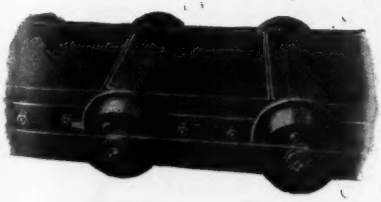


BELT CONVEYORS

Simple in design, economical of power, they give satisfaction. Different styles to suit your requirements.

A rough sketch showing conditions to be met at your plant, with capacity desired and power available, will bring our recommendations.





APRON OR PAN CONVEYORS

Flights or pans made of steel or cast iron, fitted to steel bushed self-oiling roller chain — complete with drives.

SCREW CONVEYORS

Steel "HELICOID" or Sectional flight screw conveyor for washing plants. We also make cast iron Screw Conveyors.

See Catalogue No. 38 for complete line of

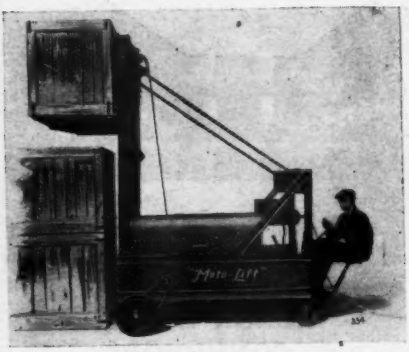
Elevating, Conveying and Power Transmitting Machinery

H. W. CALDWELL & SON COMPANY
CHICAGO
Western Avenue, 17th and 18th Streets

Solves Many Handling Problems

A machine called the Moto-Lift is the latest labor-saving commodity-handling appliance produced by the Brown Portable Conveying Machinery Co. of Chicago.

The Moto-Lift, which may be moved about by its own power by engine or motor, is of the vertical-lift, cantilever platform type. Its upright channels, which serve as platform guides, are hinged and may be collapsed in order to pass under low obstructions. There is no obstruction in front of these guide channels.



This permits the machine to be driven up to and against a pile, so that the platform extends over the top of the pile and makes it easier to transfer the goods. The platform may be lowered to the floor to pick up any regular lift truck platform or to permit a handtruck or a trailer truck to be run onto the platform. The standard machine will handle 1,000 pounds at a time.

The speed of the platform lift is 35 feet per minute. The load may be lowered either at the same rate under power or may be lowered by gravity at approximately four times that rate.

The machine travels over the floor at the rate of about 100 feet per minute and is capable of moving at nearly the same rate with its full load in either the high or low position of platform.

With the machine an operator can pick up from the floor a loaded lift truck platform, or a loaded truck, carry it down a warehouse aisle, elevate it and deliver it on top of the pile—while this is being unloaded by the men on the pile, the operator can pick up an "empty," turn in a small radius or back up, leave the empty, pick up and deliver a new load, thus keeping in constant operation. Or it can deliver its load into a car or on a truck, etc.

Haiss self-propelled, path-digging wagon loaders on a concrete paving job. The loaders are delivering to Clark tructractors